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No 2

ECONOMIC INTELLIGENCE REPORT

THE SHIPBUILDING INDUSTRY OF HUNGARY 1946-60

CIA/RR 94
31 July 1957

CENTRAL INTELLIGENCE AGENCY

OFFICE OF RESEARCH AND REPORTS

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(ORR Project 35.517)

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FOREWORD

This report traces the achievements of the shipbuilding industry of Hungary during 1946-56 and attempts to project the capabilities of this industry through 1960. The report also examines the impact of the Hungarian rebellion of October 1956 on the shipbuilding industry and the effects of the demands of the USSR for the products of the industry.

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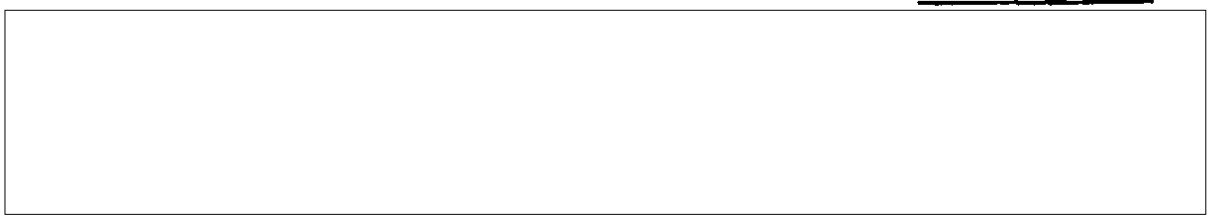

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THE SHIPBUILDING INDUSTRY OF HUNGARY*
1946-60

Summary

The shipbuilding industry of Hungary has grown considerably since World War II because of the demands of the USSR upon the industry, and almost all Hungarian production of ships during this period has gone to the USSR. The over-all effect of the rebellion of October 1956 on the shipbuilding industry of Hungary cannot yet be evaluated, but it seems evident that the previous objectives of the industry for 1960 now must constitute at best the maximum capabilities of the industry.

During and after the rebellion of October 1956, although industrial facilities were damaged, the flow of material resources was curtailed, and over-all production was interrupted, the primary effect on industry in Hungary was the irreplaceable loss of skilled and semi-skilled manpower. This loss will limit the future industrial development of the country. The center of shipbuilding activity in Hungary is Budapest, the city most seriously affected by the rebellion.

Administrative control of the shipbuilding industry is exercised by the Ministry of the Metallurgy and Machine Building Industry. The shipyards constitute a national shipbuilding trust and are under the direct control of the Administration of the Shipbuilding Industry, but indirect control seems to lie with the USSR, the primary consumer, through a commercial mission to Hungary.

The gross value of production and ship repair by the shipbuilding industry of Hungary in 1955 was more than 400 million 1955 forints (1955 US $31 million),** which constitute roughly 1 percent of the

* The estimates and conclusions contained in this report represent the best judgment of ORR as of 1 May 1957.

** Forint values are given in 1955 forints, and dollar values are given in 1955 US dollars throughout this report unless otherwise indicated. A forint-dollar ratio of 13 to 1 was used for the shipbuilding industry. For an analysis of this ratio, see Appendix E.

gross national product (GNP). The values of production, ship repair, and exports to the USSR during 1946, 1950, and 1955 were as follows:

Activity	1946		1950		1955	
	Million Forints	Million Dollars	Million Forints	Million Dollars	Million Forints	Million Dollars
Production	33	2.5	134	10.3	358	27.5
Ship repair	22	1.7	31	2.4	43	3.3
Exports to the USSR	16	1.2	124	9.5	281	21.6

Maritime and inland* vessels produced by the Hungarian shipbuilding industry in 1946, 1950, and 1955 comprise the following, measured in gross register tons (GRT),** horsepower (hp), or deadweight tons (DWT),*** as applicable:

Type of Vessel	Unit	1946	1950	1955
Maritime****	GRT	3,490	13,800	15,600
Inland, self-propelled	hp	0	2,400	26,400
Inland, non-self-propelled	DWT	0	0	2,000

* The term inland as used in this report refers to inland waterways, which include rivers, canals, and lakes.

** Gross register tonnage is a measure wherein the entire internal cubic capacity of the vessel is expressed in register tons (100 cubic feet to the ton). Certain items are not included in the measurement, such as peak tanks and other tanks of water ballast, open forecastle, bridge and poop, hatchway excess, certain light and air spaces, anchor gear, steering gear, wheelhouse, galley, cabins for passengers, and other minor spaces specified by law.

*** The deadweight tonnage of a vessel is the carrying capacity (in tons of 2,240 pounds) of the vessel. It includes the crew and their effects and all items of consumable or variable load such as stores, fuel, and cargo. The deadweight tonnage is the difference in tons between full load displacement and light ship displacement. Light ship displacement is the weight (in metric tons) of the vessel, complete, ready for service in every respect, including permanent ballast and liquids in the machinery at operating levels but excluding the crew and their effects and any items of consumable or variable load such as stores, fuel, and cargo.

**** Including floating cranes.

I. Introduction.

A. Economy of Hungary.

Hungary is a landlocked country exceeded in area by every other European Satellite except Albania. Its 93,000 square kilometers comprise about 9 percent of the total area of the European Satellites. The Hungarian economy developed rapidly from an essentially agricultural economy before World War II to its present industrialized state. The following tabulation of population and the labor force is indicative of the change in the economy from agricultural to industrial:

Category	1948 (Million Employees)	1954 (Million Employees)
Population	9.1	9.6
Labor force	3.6	4.3
Agricultural	2.0	1.9
Nonagricultural	1.6	2.4

In 1938 the GNP of Hungary was $2.5 billion; by 1954 the GNP had reached $3 billion. Agricultural production accounted for 36.5 percent of the GNP in 1938 but only 19.3 percent in 1954. In contrast, industrial production accounted for 32.5 percent of the GNP in 1938 and 50.7 percent in 1954. 1/*

During and after the rebellion of October 1956, although industrial facilities were damaged, the flow of material resources was curtailed, and over-all production was interrupted, the primary effect on industry in Hungary was the irreplaceable loss of skilled and semiskilled manpower. This loss will limit the future industrial development of the country.

The three major industrial centers of Hungary are concentrated in Budapest, Gyor, and Miskolc. [redacted] 50X1

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are on the Danube River, which provides the main water route of Hungary and an outlet to the Black Sea. Miskolc is located on the Sajo River, an unnavigable tributary of the Tisza River. The two major Hungarian shipyards, the Gheorghiu-Dej and the Obuda, are in Budapest, the center of the heaviest fighting and destruction during the rebellion of October 1956.

B. Shipbuilding Industry.

1. General.

Since World War II the Hungarian shipbuilding industry has been primarily a supplier for the USSR. Virtually all production by this industry has gone to the USSR as reparations or export commitments. As a result of the rebellion of October 1956, the USSR is reported to have removed from Hungary to the USSR those vessels which the Hungarians were constructing for the USSR. 2/

Since the middle of the 1930's, Hungary has had a small merchant fleet, which engages in trade chiefly with countries of the Near East. The small volume of foreign trade carried in Hungarian vessels obviates the need for a large merchant fleet, and the entire Hungarian merchant fleet is planned to comprise only 14 maritime vessels by 1960.

The principal inland waterways in Hungary are the Danube River, the Tisza River, and several smaller rivers. The inland waterways are an important means of transportation even though railroads and highways carry more traffic. About 10 percent of all internal freight and passenger traffic is hauled on the inland waterways. 3/ Consequently, there is a need to replace and modernize the old and low-powered vessels of the inland fleet. In large measure, however, this replacement and modernization has not been accomplished, because of the overwhelming demand of the USSR for production of vessels of all types. This policy has left Hungary with extremely limited facilities for replacement and repair of its inland fleet.

2. History.

The shipbuilding industry of Hungary was established principally because of the Danube River, and the two major shipyards were located in Budapest, the capital, principal port, and leading industrial area of the country. The first inland vessel built by the

industry was launched in 1839; and, for nearly 100 years, sporadic production of inland vessels, mostly tugs and barges, continued. The first maritime cargo vessel was built in 1934; and, during the late 1930's, three additional maritime vessels were produced. These four vessels constituted the Hungarian maritime fleet until 1955.

After World War II the industry resumed production of maritime vessels, inland vessels, and floating cranes; and production of these vessels continued through 1956. Other production now undertaken by the industry comprises inland patrol craft, inland survey vessels, small river and lake passenger vessels, various types of sailing craft, "spray boats" for agriculture, and some consumer goods such as refrigerators and motorcycle sidecars.

In 1952, Hungary purchased 14 cargo barges and 2 tank barges from France 4/ and, in 1953, was reported to have ordered 3 tank barges from Austria. 5/ These barges, which are for use on the inland waterways, have cargo carrying capacities ranging from 500 to 1,000 metric tons and are the only reported examples of vessels being imported for the inland fleet. No maritime vessels have been imported by Hungary.

3. Organization.

Administrative control of the shipbuilding industry of Hungary is exercised by the Council of Ministers through the Ministry of the Metallurgy and Machine Building Industry. The Hungarian Heavy Industry Export Trade Enterprise (Nehezipari Kulkereskedelmi -- Nikex), which controls all foreign trade, is believed to be on the same administrative level as the controlling Ministry. Although information on the relationship between Nikex and the Ministry of the Metallurgy and Machine Building Industry is not available, it must be assumed that over-all requirements for production of vessels for export, about 95 percent of all production of merchant vessels, are submitted through Nikex to the Ministry for general approval.

Detailed orders for production of vessels for export are received from Nikex, probably through the Administration of the Shipbuilding Industry, by the shipyards. The shipyards then are required to submit to Nikex an estimate of costs of production based on the cost of materials and labor. Nikex pays the shipyards for work performed. 6/ The shipyards which produce vessels are under the direct

control of the Administration of the Shipbuilding Industry and constitute a national shipbuilding trust, whereas ship repair yards and other repair facilities probably are under the administrative control of the General Administration of the Hungarian Navigation Company (Magyar Hajozasi Reszveny Tarsasag -- Mahart).

Vessels completed by Hungary for the USSR* 7/ are accepted by a Soviet commercial mission stationed permanently in Budapest. This mission is assumed to be on the same administrative level as Nikex. The tentative organization of the shipbuilding industry of Hungary is shown in the accompanying chart, Figure 1.** Names of the Minister of the Metallurgy and Machine Building Industry, of department heads, and of shipyard directors, when known, are shown on this chart.

II. Production.

A. Facilities.

1. General.

Included in the shipbuilding industry of Hungary are the Gheorghiu-Dej, the Obuda, the Balatonfured, and the Danube Shipyards, which engage in production, and possibly eight ship repair yards.*** The Gheorghiu-Dej and the Obuda Shipyards are considered major shipyards because almost 90 percent of the value of production is carried out in these shipyards. In terms of value of production, the four shipyards have accounted for the percentage distribution during 1947-55 shown in Table 1,**** which is based on Tables 8, 9, and 10./ The figures indicate that the Gheorghiu-Dej Shipyard was the leading shipyard by value during 1947-52. The Obuda Shipyard was the leader during 1953-55. The Mahart Ship Repair Yard is considered the only major ship repair yard. The Gheorghiu-Dej and Obuda Shipyards and many of the ship component plants,// which produce the various parts and materials required by the shipbuilding industry, are in Budapest.

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* See 1, p. 4, above.

** Following p. 6.

*** For locations of shipyards and ship repair yards, see Appendix A. For detailed information on the individual shipyards and ship repair yards, see Appendix D.

**** Table 1 follows on p. 7.

/ Appendix C, pp. 28, 29, and 30, respectively, below.

// For a list of major suppliers of inputs for the shipbuilding industry, see Appendix B.

Figure 1

ORGANIZATION OF THE SHIPBUILDING INDUSTRY, 1956

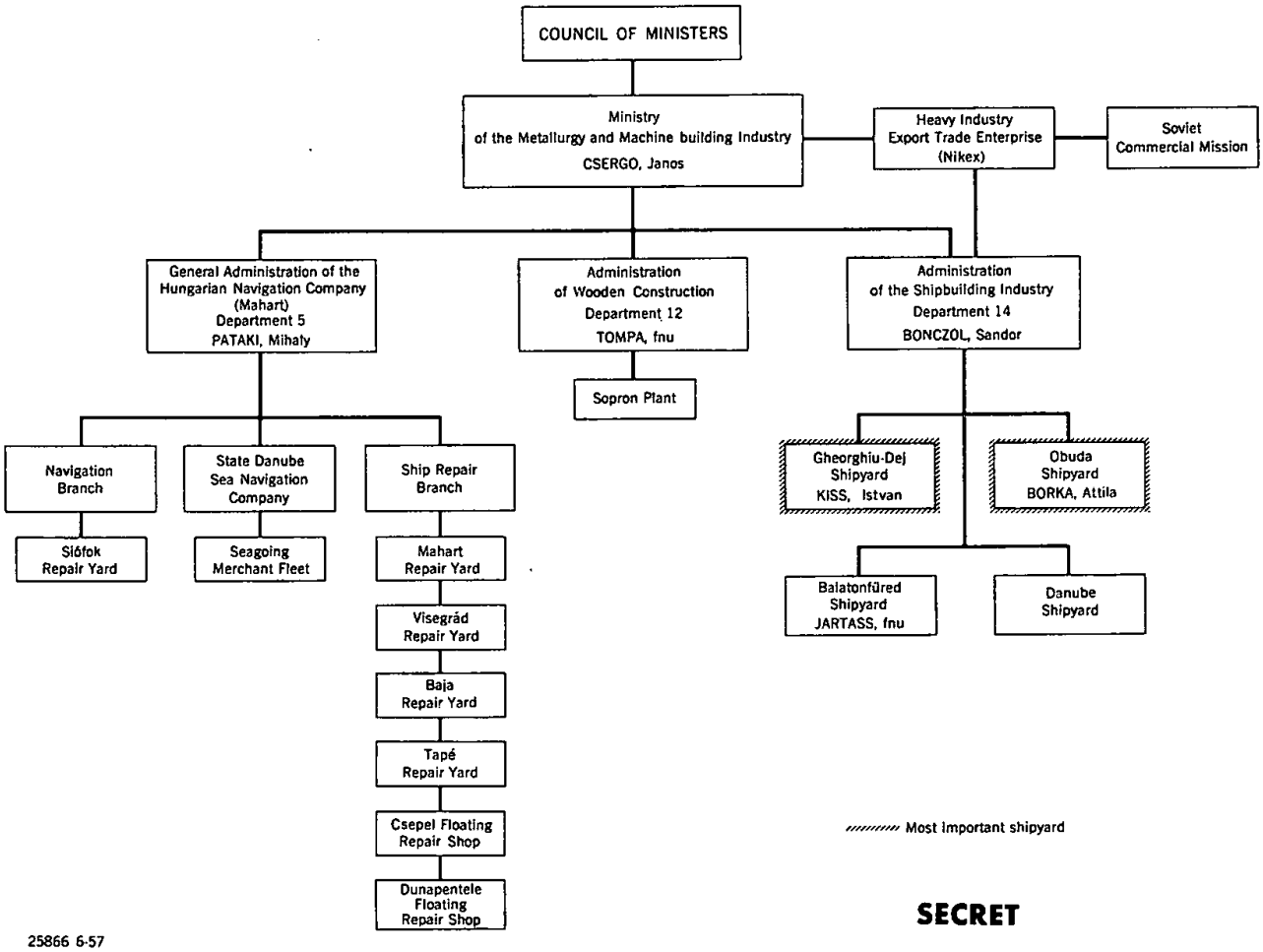

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Table 1

Percentage Distribution of the Value of Production
by the Shipbuilding Industry of Hungary
1947-55

Percent

Shipyard	1947	1948	1949	1950	1951	1952	1953	1954	1955
Gheorghiu-Dej	66	56	69	73	73	58	48	42	38
Obuda	34	44	31	27	27	37	49	44	51
Balatonfured	0	0	0	0	0	5	3	7	4
Danube	0	0	0	0	0	0	0	7	7
Total	100	100	100	100	100	100	100	100	100

Hungarian shipyards are used to produce maritime cargo vessels of about 1,200 GRT, floating cranes with lift capacities of 100 metric tons and 5 metric tons, inland passenger vessels of 450 hp, inland tugs of 400 hp, inland patrol craft, inland barges, and other small miscellaneous inland craft.

2. Gheorghiu-Dej Shipyard.

The Gheorghiu-Dej Shipyard is at present the only shipyard in Hungary which produces maritime vessels and floating cranes. It is the largest shipyard in the country and has been expanding continually or improving its facilities, spending about 90 million forints ($6.9 million) during 1948-53. As late as 1955 the shipyard was installing additional facilities as part of a general building program. 8/ It is estimated that the shipyard has 14 transverse building ways, each of which is about 250 feet long and 60 feet wide.

3. Obuda Shipyard.

The Obuda Shipyard, the second most important shipyard in Hungary, has, it is estimated, 12 transverse building ways used for production of inland passenger vessels and inland tugs.

4. Balatonfured Shipyard.

The Balatonfured Shipyard has constructed lake passenger vessels, inland patrol craft, barges, and small sailing craft. [redacted] 50X1
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[redacted]

5. Danube Shipyard.

The Danube Shipyard, at Vac, has no actual building ways but builds inland patrol craft and small inland passenger vessels on wooden blocks in an open area. The vessels then are transported to a launching area by truck.

B. Technology.

Technical methods employed by the industry before 1953 were inferior to those in use by the West. Since 1953, however, more advanced techniques for production of vessels, such as welding, prefabrication of materials, and sectional assembly, have gradually been put into operation. A new aluminum alloy named "Nautal," which is impervious to the oxidational effects of sea water, has been developed by the Hungarian Metal Industry Research Institute. This alloy was being used in production of both maritime and inland vessels in 1956. 9/

Up to 1953, vessels built at the Gheorghiu-Dej Shipyard were assembled by the riveted method of joining plates. Since 1953, most of the vessels have been built by sectional assembly 10/ -- that is, prefabricated parts of the vessel are welded together in sections and transported to the building way to be welded together to form the complete vessel. It was late in 1954 before preparations for sectional construction were completed. 11/

Soviet technicians have aided Hungary in establishing its shipbuilding industry, and the USSR has provided a large portion of the machine tools required for shipbuilding. 12/ Most of this aid has probably gone to the Gheorghiu-Dej Shipyard. The USSR has provided general plans for the construction of vessels, but these plans have been modified considerably by Hungarian designers. 13/

The vessels built at the Obuda Shipyard are only of fair quality, and their standards do not compare favorably with those of the West. These vessels are built according to Soviet shipbuilding doctrine

set forth in the Hungarian translation of the Soviet publication Standards of the Registry Bureau of the Soviet State River and Sea Navigation, which contains about 1,000 pages of basic rules on shipbuilding. The Budapest office of the Soviet Registry Bureau maintains a staff of about 12 inspectors at the Obuda Shipyard. 14/

C. Value and Volume.

1. Plans and Plan Fulfillment.

Over-all or detailed plans and plan fulfillment for the shipbuilding industry are not available. Some reports of plan fulfillment for the Ministry of the Metallurgy and Machine Building Industry, however, are available. These reports indicate that the Ministry fulfilled its plans for selected years as follows:

Plan Year	Fulfillment (Percent)
1949	107.1 15/
1954	100.3 16/
1955	104.9 17/

The Three Year Plan (1947-49) listed among important planned investments an assembly plant for the Gheorghiu-Dej Shipyard. The Plan also called for reconstruction and extension of this shipyard and refloating and reconditioning of inland vessels. 18/ During the plan period, 43 million current forints (current $3.3 million) were reported as planned expenditures at the Gheorghiu-Dej Shipyard. 19/

The First Five Year Plan (1950-54) stated that the Danube Fleet would be increased by production of 2 inland passenger vessels, 59 inland barges, 6 inland tugs, and 3 maritime vessels. The two passenger vessels are the only ones known to have been built. From the vessels to be built by Hungary during the Second Five Year Plan (1956-60), Hungary is to retain for domestic use 8 maritime vessels, 8 lake passenger vessels, 50 barges, and 15 tugs. 20/ Production by the shipbuilding industry of Hungary during 1947-55, by type of vessel, is shown in Table 2.*

* Table 2 follows on p. 10.

Table 2

Production by the Shipbuilding Industry of Hungary
by Type of Vessel
1947-55

Type of Vessel	Physical Quantity	Value a/* Million 1955 Forints	Value a/* Million 1955 Dollars
Three Year Plan (1947-49)			
Maritime vessel	23,119 GRT b/	175.9	13.5
Floating crane	2,142 GRT	26.1	2.0
Inland tug	6,400 hp c/	68.0	5.2
Total		270.0	20.7
First Five Year Plan (1950-54)			
Maritime vessel	53,576 GRT	407.4	31.3
Floating crane	19,710 GRT	217.4	16.7
Inland tug	19,200 hp	204.0	15.7
Inland passenger vessel	10,350 hp	250.0	19.2
Inland patrol craft	21,600 hp	51.0	3.9
Total		1,129.8	86.8
One Year Plan (1955)			
Maritime vessel	10,746 GRT	81.7	6.3
Floating crane	4,842 GRT	52.2	4.0
Inland tug	4,800 hp	51.0	3.9
Inland passenger vessel	5,400 hp	132.0	10.2
Inland patrol craft	16,200 hp	38.3	2.9
Barge	2,000 DWT d/	2.7	0.2
Total		357.9	27.5

* Footnotes for Table 2 follow on p. 11.

Table 2

Production by the Shipbuilding Industry of Hungary
by Type of Vessel
1947-55
(Continued)

Type of Vessel	Physical Quantity	Value a/ Million 1955 Forints	Value a/ Million 1955 Dollars
	Total (1947-55)		
Maritime vessel	87,441 GRT	665.0	51.1
Floating crane	26,694 GRT	295.7	22.7
Inland tug	30,400 hp	323.0	24.8
Inland passenger vessel	15,750 hp	382.0	29.4
Inland patrol craft	37,800 hp	89.3	6.8
Barge	2,000 DWT	2.7	0.2
Grand total		1,757.7	135.0

a. A forint-dollar ratio of 13 to 1 was used for the shipbuilding industry. For an analysis of this ratio, see Appendix E.
b. Gross register tons.
c. Horsepower.
d. Deadweight tons.

2. Value.

The value of production and ship repair in Hungary in 1950 was 164.7 million forints ($12.7 million). By 1955 this figure had risen to 400.9 million forints ($30.8 million -- roughly 1 percent of the Hungarian GNP), an increase of 143 percent compared with 1950. During this same period the value of production by the shipbuilding industries of the European Satellites as a whole increased about 95 percent. In comparison with a small Western country, Belgium, the value of production by the shipbuilding industry of Hungary during 1955 was 42 percent of the value of production by the shipbuilding industry of Belgium in the same year.

The growth of the shipbuilding industry of Hungary has been more rapid than that of the GNP as a whole and of the industrial sector of the GNP. Index figures for 1950-55 are shown in Table 3, which is based on Table 10.*

Table 3

Indexes of the Gross National Product
the Industrial Sector of the Gross National Product
and Production and Repair by the Shipbuilding Industry of Hungary
1950-55

1950 = 100

Category	1950	1951	1952	1953	1954	1955
Hungarian GNP a/	100	109	118	127	128	135
Industrial sector of the Hungarian GNP	100	116	135	145	152	161
Production and repair by the shipbuilding industry	100	95	144	224	234	243

a. Gross national product.

The Gheorghiu-Dej Shipyard was the leading producer of vessels in Hungary until 1953. During 1953-55 the value of production at the Obuda Shipyard surpassed that of the Gheorghiu-Dej Shipyard because the Obuda Shipyard produced a greater number of smaller river vessels with a relatively higher value per vessel. The more important type of vessel produced in Hungary, the small maritime cargo type, however, probably will continue to be produced at the Gheorghiu-Dej Shipyard because of the facilities and experience of this shipyard. Production by the shipbuilding industry of Hungary during 1946-55, by shipyard, in tonnage and in horsepower, is shown in Table 8.**

* P. 30, below.
** P. 28, below.

3. Production Projected for 1956-60.

Before the Hungarian rebellion of October 1956 it was estimated that in 1960 the value of production by the shipbuilding industry of Hungary would have been 507.1 million forints ($39.0 million), an increase in value of production of 42 percent over that during 1955. This increase would have amounted to about 7.2 percent per Plan year. During the First Five Year Plan (1950-54) the increase in value of production during 1954 was 200.6 percent of that during 1949, or about 14.9 percent per Plan year. The larger increase in production during the First Five Year Plan is probably a result of (a) the postwar build-up of the industry with its attendant increase in productive facilities and (b) increased production of inland vessels. The industry having been built up during the First Five Year Plan, the rate of increase during the Second Five Year Plan (1956-60) is expected to be lower.

The projected estimated increase in production would have been 42 percent during the Second Five Year Plan, based on the Plan announcement of an increase of 40 percent in the volume of foreign trade and on the large planned increase in production for domestic consumption. This increase of 42 percent may be compared with the following increases planned for other sectors of the Hungarian economy: industry, 47 to 50 percent; capital goods, 58 to 60 percent; rolled steel, 58 percent; and crude steel, 38 percent. The projected increase in value of production might have been possible if more efficient use were made of available productive facilities and if planned increases in the productivity of labor were achieved. As a result of the Hungarian rebellion, it seems evident that the previous objectives of the industry for 1960 now must constitute at best the maximum capabilities of the industry. Because the October rebellion took place during the period of the year when outdoor shipbuilding activity is at a minimum, the effect on production may have been less serious than if the rebellion had taken place during the summer months of maximum shipbuilding activity. The accompanying chart, Figure 2,* shows the growth of the shipbuilding industry of Hungary since 1946.

III. Distribution of Production.

A. Integration of the Soviet Bloc.

Small cargo vessels of about 1,200 GRT, imported by the USSR for use in coastal trade in the Far East, have been constructed only

* Following p. 14.

by the Hungarian shipbuilding industry. (A few vessels of the same general type but of slightly less tonnage also have been imported by Rumania from Hungary.) Maritime vessels of greater tonnage are supplied to the USSR by Poland and East Germany. A comparison of estimated Soviet imports of self-propelled maritime vessels constructed by the three leading suppliers among the European Satellites is shown in Table 4.

Table 4

Estimated Imports of Maritime Vessels by the USSR
from Poland, East Germany, and Hungary
1951-55

	1951	1952	1953	1954	1955
Satellite	Thousand Gross Register Tons				
Poland	2.0	21.0	27.7	62.1	68.4
East Germany	0.2	10.1	5.8	40.0	43.9
Hungary	8.4	10.7	9.6	10.7	6.0
Total	10.6	41.8	43.1	112.8	118.3
	Percent of Total				
Hungary	79	26	22	9	5

The reduction in percentage of GRT supplied by Hungary to the Soviet Bloc during 1951-55 is not a result of decreased production in Hungary but reflects an increase in production by the Polish and East German shipbuilding industries and consequently in the amount of GRT supplied by these countries. The GRT supplied the USSR by Hungary in 1955 is lowest, compared with that of previous years, because of other export commitments (2 vessels to Communist China and 1 coastal passenger vessel to Poland) and retention of 1 vessel for domestic use.

In production of self-propelled inland vessels for the USSR, Hungary has bettered its relative position among the European Satellites

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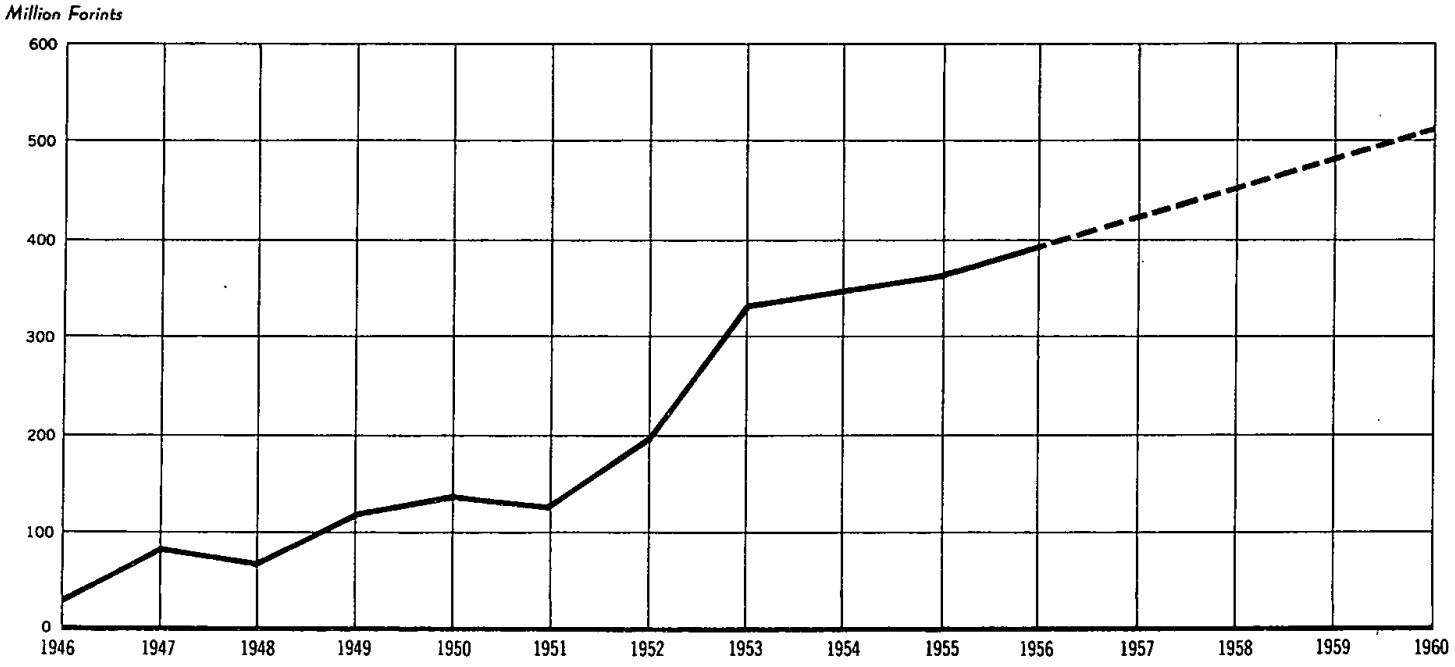
Figure 2

HUNGARY

VALUE OF PRODUCTION BY THE SHIPBUILDING INDUSTRY, 1946-55 AND PROJECTED VALUE, 1956-60



Excluding value of ship repair

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during 1950-55. Of the total value of inland self-propelled vessels imported by the USSR from the Satellites, Hungary contributed only 10.2 percent in 1950 but 25.7 percent by 1955. The total value of inland self-propelled vessels imported by the USSR from the European Satellites, the value delivered by each Satellite, and the percentage of the total Satellite value delivered by Hungary during 1950-55 are shown in Table 5.

Table 5

Estimated Value of Imports of Inland Self-Propelled Vessels by the USSR from the European Satellites a/ 1950-55

Satellite	1950	1951	1952	1953	1954	1955
	Million 1955 US Dollars					
East Germany	0	2.3	4.0	4.8	6.4	5.4
Czechoslovakia	5.9	5.9	11.0	15.8	15.8	15.8
Rumania	11.1	12.3	13.7	15.2	17.3	18.8
Bulgaria	0.7	0.7	0.7	0.8	0.8	0.8
Hungary	2.0	2.0	5.6	12.4	11.5	14.1
Total	19.7	23.2	35.0	49.0	51.8	54.9
	Percent of Total					
Hungary	10.2	8.6	16.0	25.3	22.2	25.7

a. The USSR imported no inland self-propelled vessels from Albania and Poland during 1950-55.

The Hungarian shipbuilding industry has attained its present high level since World War II because of the importance of the USSR as its leading customer. At the same time the Hungarian inland fleet has been badly in need of repair or replacement. These repairs or replacements have not been accomplished, because of the demand by the USSR for vessels as reparations or exports. During the postwar

period, Hungary has been allowed to retain only 2 maritime vessels from its entire production of about 75. Hungary also has retained a few minor inland vessels.

The bulk of the maritime vessels built by the shipbuilding industry of Hungary has gone to the USSR for coastal trade in the Far East. Lately a few of these vessels have gone to the Baltic, Black, and Caspian Seas. Inland vessels produced in Hungary are used on the Soviet system of inland waterways.

B. Hungarian Exports.

An analysis of production and distribution of production by the shipbuilding industry of Hungary indicates that the bulk of Hungarian production has been for export to the USSR, with little going to other European Satellites. During 1946-55, of a total value of 1,790.8 million forints ($137.8 million) worth of vessels produced by Hungary, 1,607.9 million forints ($123.7 million), or 90 percent, was exported to the USSR, as shown in Table 11.* This total included about 72 maritime vessels totaling 82,320 GRT, 76 tugs totaling 30,400 hp, and 33 passenger vessels totaling 14,850 hp. During the Three Year Plan (1947-49), 100 percent of the total value of Hungarian production of vessels (270 million forints -- $20.8 million) was exported to the USSR. During the First Five Year Plan (1950-54) an average of 96 percent of the total value produced (1,129.8 million forints -- $86.9 million) was exported, 92 percent to the USSR and 4 percent to other Satellites. Only 4 percent of the total value produced was retained by Hungary for domestic use. Under the One Year Plan of 1955 a change in the pattern of exports began to develop. During 1955, of the total value produced (357.9 million forints -- $27.5 million), 78.4 percent went to the USSR, 11.2 percent went to other Satellites, and 10.4 percent was retained for domestic use.

IV. Inputs.

A. Supply of Materials and Components.

Almost all of the materials and components required by the Hungarian shipbuilding industry are produced in Hungary. Maritime vessels and floating cranes produced by the Gheorghiu-Dej Shipyard are equipped with diesel engines supplied by the Ganz Railroad Car

* Appendix C, p. 31, below.

and Engineering Plant or the "Aprilis 4" Plant (formerly the Lang Machine Plant) in Budapest. 21/ Steam engines required for inland vessels built by the Obuda Shipyard are made in the shipyard. These engines are of 2 types, 450 hp for passenger vessels and 400 hp for tugs. 22/

The bulk of the iron and steel products required by the shipbuilding industry is furnished by the Lenin Metallurgical Plant in Diosgyor and the Metallurgical Plant in Ozd. Many of such important components and materials as ship plate, castings, and fittings come from plants located in the Budapest area in close proximity to the important shipyards.* Some components are installed abroad -- for example, cargo-handling gear, in Rumania, 23/ and certain electronic equipment such as radar and navigational devices, possibly at Odessa in the USSR. Generally, other components and parts are produced in the Budapest area. Indigenous production of major components is sufficient to meet the requirements of the shipbuilding industry.

The inputs shown in Table 12** reflect those required for production at all shipyards which construct vessels. Additional inputs of material and labor for repair facilities are estimated at less than 5 percent of the requirements for production.

B. Labor.

Employment in the shipbuilding industry has risen considerably since World War II. In 1947 the industry had a total of about 3,600 workers, but it is estimated that by 1955 the total number of workers reached 8,500, of which 7,200 were employed at shipyards engaged in new construction and 1,300 were employed at ship repair facilities. Table 6*** shows the distribution of labor in the shipbuilding industry of Hungary. 24/

V. Intentions, Capabilities, and Limitations.

A. Intentions.

Production by the shipbuilding industry of Hungary is much greater than it was before World War II. Because this growth in

* For the locations of major suppliers of inputs for the shipbuilding industry, see Appendix B.
** Appendix C, p. 32, below.
*** Table 6 follows on p. 18.

Table 6

Distribution of Labor
in the Shipbuilding Industry of Hungary
1955

Shipyards and Ship Repair Facilities	Employees: Direct Labor [a]	Employees: Total Labor
Gheorghiu-Dej	2,400	3,000
Obuda	2,400	3,000
Balatonfured	640	800
Danube	320	400
Mahart Ship Repair Yard	560	800
Other repair facilities	350	500
Total	6,670	8,500

a. Direct labor represents workers employed in actual production work. Indirect labor represents workers employed in an auxiliary capacity such as that of crane operators.

production has resulted from Soviet demand, the industry is dependent upon Soviet orders for its economic life and literally has outgrown the internal need for a shipbuilding industry. Any sudden termination of Soviet orders would cause an economic standstill in the industry. 25/ This peculiar position has necessitated attempts by Hungary to find markets in the Far East and in underdeveloped areas for the products of its shipbuilding industry. These attempts have been partly successful and indicate one or more of the following:

1. a decrease in the Soviet demand for vessels,
2. an attempt to penetrate underdeveloped areas (for example, tugs for Syria),
3. evidence of integration of the Sino-Soviet Bloc, and
4. an expected increase in capacity for shipbuilding.

Present evidence seems to point to 1, 2, and 3, above, as the most likely current possibilities, with 4 as a future possibility.

This policy for production and export, probably undertaken with the approval of the USSR, is considered a trend in the shipbuilding industry of Hungary that will continue during the Hungarian Second Five Year Plan (1956-60). Future production for domestic consumption will show a decided increase over the past although the number of maritime vessels involved will represent only 1.6 vessels per year during 1956-60. Repair of the inland fleet will probably continue at the Mahart Ship Repair Yard, the one major repair facility in the country. Replacement of the inland fleet will be accelerated during 1956-60, with 50 barges, 15 tugs, and 8 lake passenger vessels scheduled for construction.

B. Capabilities.

Before the Hungarian rebellion of October 1956 the shipbuilding industry of Hungary probably possessed the capability necessary to carry out successfully the plans for production and export.* The destruction of industrial facilities and material resources and the expatriation of skilled workers may affect adversely the capability of the shipbuilding industry to carry out its plans. Estimated maximum capability for annual production on a one-shift basis of selected types of vessels is shown in Table 7.**

C. Limitations.

The shipbuilding industry is limited to production of small maritime vessels up to a maximum size of about 2,500 GRT because of restrictions imposed by low water levels on the Danube. Foreign orders are required in order to keep the industry at its present or at an increased productive level, domestic demand being insufficient for these purposes.

* See A, p. 17, above.
** Table 7 follows on p. 20.

Table 7

Estimated Maximum Capability for Annual Production of Selected Types of Vessels by the Shipbuilding Industry in Hungary a/ 1956-60

Shipyard	Type of Vessel	Capability	
		Physical Quantity	Value (Million 1955 Forints b/)
Gheorghiu-Dej	Maritime cargo vessel	25,000 GRT c/	190
Obuda	Inland passenger vessel	8,100 hp d/	275
Obuda	Inland tug	7,200 hp	
Balatonfured	Inland patrol craft	21,600 hp	50
Danube	Inland patrol craft	10,800 hp	25

a. Based on maximum production estimated for 1955 and on the assumption that all facilities at each shipyard were used to construct the types of vessels listed in this table. For example, it was assumed that, of the 12 building ways at the Obuda Shipyard, 6 were used for construction of inland passenger vessels and 6 for inland tugs.
b. A forint-dollar ratio of 13 to 1 was used for the shipbuilding industry. For an analysis of this ratio, see Appendix E.
c. Gross register tons.
d. Horsepower.

APPENDIX A

LOCATIONS OF SHIPYARDS AND SHIP REPAIR YARDS IN HUNGARY

1. Shipyard*

	Location
Gheorghiu-Dej	Budapest
Obuda	Budapest
Balatonfured	Balatonfured
Danube	Vac

2. Ship Repair Yard

Mahart	Budapest
Csepel**	Budapest
Dunapentele**	Dunapentele
Siofok	Siofok
Visegrad	Visegrad
Baja	Baja
Tape	Tape
Sopron***	Sopron

50X1

[redacted]

* All these shipyards were in operation during 1956.
** A floating repair shop.
*** This yard does not engage in ship repair but builds pontoons for the Hungarian army. 26/

APPENDIX B

MAJOR SUPPLIERS OF INPUTS FOR THE SHIPBUILDING INDUSTRY OF HUNGARY 27/

City	Plant	Component or Material
Ajka,	Aluminum plant	Ingots, billets, plate, sheet, pipe rods, and the like.
Borsodnadasd,	Metallurgical plant	Sheet metal.
Budapest,	Lorinci Rolling Mills	Boiler and ship plate.
	Ganz Railroad Car and Engineering Plant	Marine diesel engines, propeller castings, and pumps.
	Aprilis 4 (formerly Lang Machine)	Marine diesel engines, motors, and castings.
	Industrial chain plant	Anchor chains and cables.
	Klement Gottwald (formerly Ganz Electrical Engineering) Plant	Electric motors and generators.
	Matyas Rakosi Metal Plant	Welding electrodes, propeller castings, pipes, and marine boiler tubes.
	Crude oil pump plant	Carburetors for outboard motors and fuel injection pumps for marine diesels.

50X1

City and Coordinates	Plant	Component or Material
Budapest, [redacted]	Kontakta	Electrical fittings.
	Cable and synthetic materials plant	Insulated cable, nylon rope, and insulation material.
	Electric machine and cable plant	Electric motors, wiring, and cable.
	Electric rotor and machine plant.	Electric motors for pumps.
	Screw and bolt plant	Rivets, screws, bolts.
	Storage battery and dry cell (formerly Tudor) plant	Batteries.
	Automotive electric appliances plant	Batteries.
	Small pumps plant	Pumps.
	Vehicle equipment plant	Door handles and fittings.
	Rubber goods plant	Linoleum.
	Gamma Optical Plant	Mirror parts for signal lights.
	Small motor and machine plant	Motors for assault pontoon boats.
	Angyalföld Iron Appliances Plant	Outboard motors.

50X1

City and Coordinates	Plant	Component or Material	
Budapest, [redacted] (Continued)	Gheorghiu-Dej Shipyard	Marine diesel cylinder heads and reduction gears.	50X1
	Obuda Shipyard	Steam engines, marine boilers, paddle wheels, cogwheels, and signal lights.	
Diosgyor, [redacted]	Lenin Metallurgical Plant	Rolled steel, sections, propeller shafts, and crankshafts for marine diesels.	50X1
Inota, [redacted]	Aluminum Plant	Ingots, billets, plate, sheet, and pipe.	50X1
Miskolc, [redacted]	Steel wire and cable plant.	Wire and cable.	50X1
Ozd, [redacted]	Metallurgical plant	Ship plate.	50X1

APPENDIX C

STATISTICAL TABLES

Table 8

Production by the Shipbuilding Industry of Hungary
by Shipyard, in Tonnage and Horsepower
1946-55

Shipyard and Type of Vessel	Unit of Measurement	1946	Three Year Plan 1947	1948	1949	First Five Year Plan 1950	1951	1952	1953	1954	One Year Plan (1955)
Gheorghiu-Dej											
Maritime vessel	GRT a/	2,060	5,675	4,500	9,208	11,768	8,358	10,746	9,552	10,746	10,746
Floating crane (lift capacity -- 100 metric tons)	GRT	1,428	714	714	714	714	714	1,428	4,998	2,856	2,142
Floating crane (lift capacity -- 5 metric tons)	GRT	0	0	0	0	0	1,800	1,800	2,700	2,700	2,700
Total	GRT	3,488	6,389	5,214	9,922	12,482	10,872	13,974	17,250	16,302	15,588
Obuda											
Maritime vessel	GRT	0	1,324	1,088	1,324	1,318	1,088	0	0	0	0
Inland tug	hp b/	0	1,600	2,400	2,400	2,400	2,400	4,800	4,800	4,800	4,800
Inland passenger vessel	hp	0	0	0	0	0	0	900	4,500	4,050	5,400
Total	hp	0	1,600	2,400	2,400	2,400	2,400	5,700	9,300	8,850	10,200
Balatonfured c/											
Inland passenger vessel	hp	0	0	0	0	0	0	450	450	0	0
Inland patrol craft	hp	0	0	0	0	0	0	0	0	10,800	5,400
Total	hp	0	0	0	0	0	0	450	450	10,800	5,400
Danube											
Inland patrol craft	hp	0	0	0	0	0	0	0	0	10,800	10,800
Grand total of GRT		3,488	7,713	6,302	11,246	13,800	11,960	13,974	17,250	16,302	15,588
Grand total of hp		0	1,600	2,400	2,400	2,400	2,400	5,150	9,750	30,450	26,400

a. Gross register tons.
b. Horsepower.
c. In 1955 this shipyard produced a total of 2,000 deadweight tons of barges, which was the total of non-self-propelled vessels produced during 1946-55.

Table 9

Production by the Shipbuilding Industry of Hungary
by Shipyard, in Number of Vessels a/
1946-55

Units

Shipyard and Type of Vessel	1946	Three Year Plan 1947	1948	1949	First Five Year Plan 1950	1951	1952	1953	1954	One Year Plan (1955)	Total
Gheorghiu-Dej											
Maritime vessel	2	4	4	8	10	7	9	8	9	9	70
Floating crane (lift capacity -- 100 metric tons)	2	1	1	1	1	1	2	7	4	3	23
Floating crane (lift capacity -- 5 metric tons)	0	0	0	0	0	6	6	9	9	9	39
Obuda											
Maritime vessel	0	2	2	2	2	2	0	0	0	0	10
Inland tug	0	4	6	6	6	6	12	12	12	12	76
Inland passenger vessel	0	0	0	0	0	0	2	10	9	12	33
Balatonfured											
Inland passenger vessel	0	0	0	0	0	0	1	1	0	0	2
Inland patrol craft	0	0	0	0	0	0	0	0	30	15	45
Barge	0	0	0	0	0	0	0	0	0	2	2
Danube											
Inland patrol craft	0	0	0	0	0	0	0	0	30	30	60
Total	4	11	13	17	19	22	32	47	103	92	360

a. Figures represent vessels completed but not necessarily operational.

Table 10

Value of Production and Repair by the Shipbuilding Industry of Hungary a/ 1946-55

Million 1955 Forints b/

Shipyard, Ship Repair, and Type of Vessel	1946	Three Year Plan 1947	1948	1949	First Five Year Plan 1950	1951	1952	1953	1954	One Year Plan (1955)
Gheorghiu-Dej c/										
Maritime vessel	15.7	43.2	34.2	70.0	89.5	63.6	81.7	72.6	81.7	81.7
Floating crane (lift capacity -- 100 metric tons)	17.4	8.7	8.7	8.7	8.7	8.7	17.4	60.8	34.8	26.1
Floating crane (lift capacity -- 5 metric tons)	0	0	0	0	0	17.4	17.4	26.1	26.1	26.1
Subtotal	33.1	51.9	42.9	78.7	98.2	89.7	116.5	159.5	142.6	133.9
Obuda c/										
Maritime vessel	0	10.1	8.3	10.1	10.0	8.3	0	0	0	0
Inland tug	0	17.0	25.5	25.5	25.5	25.5	51.0	51.0	51.0	51.0
Inland passenger vessel	0	0	0	0	0	0	22.0	110.0	99.0	132.0
Subtotal	0	27.1	33.8	35.6	35.5	33.8	73.0	161.0	150.0	183.0
Balatonfured c/										
Inland passenger vessel	0	0	0	0	0	0	9.5	9.5	0	0
Inland patrol craft	0	0	0	0	0	0	0	0	25.5	12.8
Barge	0	0	0	0	0	0	0	0	0	2.7
Subtotal	0	0	0	0	0	0	9.5	9.5	25.5	15.5
Danube										
Inland patrol craft	0	0	0	0	0	0	0	0	25.5	25.5
Subtotal	0	0	0	0	0	0	0	0	25.5	25.5
Total of all shipyards c/	33.1	79.0	76.7	114.3	133.7	123.5	199.0	330.0	343.6	357.9
Ship repair d/	21.5	24.0	26.5	29.0	31.0	33.5	36.0	38.5	40.5	43.0
Grand total e/	54.6	103.0	103.2	143.3	164.7	157.0	235.0	368.5	384.1	400.9

a. The estimated margin of error is plus or minus 20 percent.
b. A forint-dollar ratio of 13 to 1 was used for the shipbuilding industry. For an analysis of this ratio, see Appendix E.
c. Including only the value of production.
d. Including only the value of ship repair.
e. Including the value of production and ship repair.

Table 11

Value of Exports of Production by the Shipbuilding Industry of Hungary a/
1946-55

Destination and Type of Vessel	Three Year Plan				Five Year Plan					One Year Plan (1955)	Total
	1946	1947	1948	1949	1950	1951	1952	1953	1954		
	Million 1955 Forints b/										
To the USSR											
Maritime vessel c/	15.7	62.0	51.2	88.8	98.2	89.7	116.5	159.5	142.6	97.7	893.4
Inland vessel d/		17.0	25.5	25.5	25.5	25.5	73.0	161.0	150.0	183.0	714.5
Total	15.7	79.0	76.7	114.3	123.7	115.2	189.5	320.5	292.6	280.7	1,607.9
To Communist China											
Maritime vessel										18.2	18.2
To Poland											
Maritime vessel										9.0	9.0
Inland patrol craft									25.5	12.8	38.3
Total									25.5	21.8	47.3
To Rumania											
Maritime vessel					10.0	8.3					18.3
Grand total	15.7	79.0	76.7	114.3	133.7	123.5	189.5	320.5	318.1	320.7	1,691.7
	Percent										
Percent of total value exported	47	100	100	100	100	100	95	97	93	90	94

a. The estimated margin of error is plus or minus 20 percent. The figures do not include value of repair.
b. A forint-dollar ratio of 13 to 1 was used for the shipbuilding industry. For an analysis of this ratio, see Appendix E.
c. Including floating cranes.
d. Tugs and passenger vessels.

Table 12

Input Requirements for Production by the Shipbuilding Industry of Hungary a/
1950 and 1955

Type of Input	Quantity 1950	Quantity 1955	Percentage of the Hungarian Total 1950	Percentage of the Hungarian Total 1955
	Metric Tons			
Carbon steel	8,596	13,916		
Alloy steel	448	1,114		
Total	9,040	15,023	1.78	1.70
Cast iron	294	2,863	N.A.	N.A.
Copper and copper base alloys	216	639	N.A. b/	N.A. b/
Aluminum	24	2,043	0.11	5.52
Lead	11	131	N.A. b/	N.A. b/
Tin	6	33	0	0
Zinc	18	92	N.A. b/	N.A. b/
Rubber	12	16	0	0
Nickel and miscellaneous metals	18	106	0	0
Lumber	439	2,539	0.05	0.25
	Thousand Kilowatt-Hours c/			
Power	11,796	24,707	0.42	0.45
	Man-Years			
Labor	1,168	3,090	0.12 d/	0.24 d/

a. All the requirements reflect US practice. The requirements include all inputs within the shipyard and within the component plants but do not include inputs for production of raw materials or inputs for ship repair. The estimated margin of error is plus or minus 25 percent.
b. Indigenous production of these inputs during 1950 and 1955 was either zero or negligible.
c. Including not only electric power but also all inputs of other power and fuel, measured in equivalent kilowatt-hours.
d. Percentage of the industrial labor force.

APPENDIX D

INDIVIDUAL SHIPYARDS AND SHIP REPAIR YARDS IN HUNGARY

1. Gheorghiu-Dej Shipyard.

a. Locale and History.

The Gheorghiu-Dej Shipyard is located on the left (east) bank of Ujpest Basin, an arm of the Danube River, in the Fourth District of Budapest. Because the shipyard includes an independent crane plant which works in close cooperation with the shipyard, both the shipyard and the crane plant are considered as a single entity. 28/

Opposite the main section of the shipyard is the former Latzkovics Shipyard, which has been part of the Gheorghiu-Dej Shipyard since 1949. 29/ Before 11 July 1952 the Gheorghiu-Dej Shipyard was known as the Ganz Shipyard. On that date the name of the shipyard was changed in honor of Gheorghiu-Dej, Premier of Rumania.

b. Biographical Data.

The following persons have been identified at the Gheorghiu-Dej Shipyard:

Name	Position
Kiss, Istvan	Manager in 1955 30/
Ormos	Director in 1954 31/
Paal, Joszef	Chief Engineer in 1953 32/
Udvardi, Sandor	Production Engineer 33/
Schmidt, Imre	Chief Accountant 34/

c. Facilities.

The Gheorghiu-Dej Shipyard has an area of some 50 acres and contains the necessary machine ships, foundry, carpenter shop, and other shops associated with shipbuilding. 35/

The main section of the shipyard is estimated to have 10 transverse building ways, which are in reality 1 continuous construction area. These ways are served by 5 traveling gantry cranes, 1 mobile 25-ton jib crane, and 1 other mobile crane. The total length of the construction area is about 2,500 feet, each set of ways being about 250 feet long and 60 feet wide.

Maritime vessels and floating cranes built at this shipyard are launched transversely, probably on temporary or removable ground ways. [redacted] 50X1
[redacted] There are possibly 4 additional transverse building ways, each set of ways being 250 feet long and 60 feet wide, in the area of the former Latzkovics Shipyard. The facilities have expanded considerably since the end of World War II. The reported capital expenditures for new equipment for the Gheorghiu-Dej Shipyard are shown in Table 13. 50X1

Table 13

Reported Capital Expenditures at the Gheorghiu-Dej Shipyard in Hungary
1948-53

Year	Expenditure (Million Current Forints) a/	Remarks
1948	43.0	Planned for a 3-year period. b/
1952	2.6	For a "concrete wall" (probably a fitting-out quay). c/
1952	0.4	For a forge. c/
1952	4.8	For a carpenter shop. c/
1952	0.7	For an electric welding shop. c/
1953	38.0	For a new hull-fabrication shop. d/
1953	0.5	For a dining hall and a nursery. e/

a. A forint-dollar ratio of 13 to 1 was used for the shipbuilding industry. For an analysis of this ratio, see Appendix E.
b. 36/
c. 37/
d. 38/
e. 39/

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Names or Class	Main Characteristics	Remarks
Ul'yana Gromova Class	Tonnage, 1,194 GRT Length, 216 feet Beam, 40 feet Draft, 13 feet Speed, 9 knots Propulsion, diesel Power, 800 hp	Cargo type. Production began in 1949 and was still in progress in 1956. It is estimated that 56 vessels of this class were built by the end of 1955. All but three of these vessels were exported to the USSR. Two were exported to Communist China, and one was retained by Hungary.
Simeiz, Koreiz	Tonnage, 1,030 GRT Length, 236 feet Beam, 33 feet Draft, 11 feet Speed, 14 knots Propulsion, diesel Power, 800 estimated hp	Cargo type. These two vessels were built in 1946 and were exported to the USSR.
Chiatura (or Chiatury)	Tonnage, 2,396 GRT Length, 306 feet Beam, 43 feet Draft, 19 feet Speed, N.A. Propulsion, diesel Power, 1,600 hp	Cargo type. This vessel was built in 1948 and was exported to the USSR.
Don, Dnepr, Kal'mius, Livadiya, Massandra, Odessa, Simferopol'	Tonnage, 1,125 GRT Length, 238 feet Beam, 33 feet Draft, 11 feet Speed, 14 knots Propulsion, diesel Power, 800 estimated hp	Cargo type. These seven vessels were built in 1947 and 1948 and were exported to the USSR.

Names or Class	Main Characteristics	Remarks
Manych, Ural, Desna	Tonnage, 1,022 GRT Length, 238 feet Beam, 33 feet Draft, 10 feet Speed, 14 knots Propulsion, diesel Power, 800 estimated hp	Cargo type. These three vessels were built in 1949 and 1950 and were exported to the USSR.
Mazowsze	Tonnage, 1,181 GRT Length, 198 feet Beam, 35 feet Draft, 10.5 feet Speed, 14 knots Propulsion, diesel Power, 1,600 hp Capacity, 600 passengers	Coastal passenger type. This vessel was built in 1955 and was exported to Poland.

Since 1946 the Gheorghiu-Dej Shipyard has also built floating cranes of the two types listed below. 45/

Type	Main Characteristics	Remarks
Self-propelled	Tonnage, 714 GRT Length, 141 feet Beam, 62 feet Mean draft, 4.5 feet Speed, 4.7 knots Lift capacity, 100 tons Propulsion, diesel Power, 320 hp	Twenty-three of these self-propelled cranes were built by the end of 1955. Nearly all were exported to the USSR.
Non-self-propelled	Tonnage, 300 GRT Length, 72.7 feet Beam, 47.6 feet Mean draft, 216 feet Lift capacity, 5 tons	It is estimated that 39 of these non-self-propelled cranes were built by the end of 1955. Nearly all were exported to the USSR.

e. Labor.

Figures on labor at the Gheorghiu-Dej Shipyard during 1947-55 have been interpolated as follows.

Year	Employees
1947	2,700
1948	2,750
1949	2,800
1950	2,800
1951	2,850
1952	2,900
1953	2,900
1954	2,950
1955	3,000

Wages of the employees of the shipyard are reported to compare favorably with those of other industrial workers, but the application of working norms which exploited the workers, of drives in productivity, and of harsh methods of labor control have combined to induce high rates of absenteeism and turnover of labor. The increase in turnover of labor in 1954 over that in 1953 was reported to be from 100 to 200 percent. 46/

f. Maximum Capability for Production.

Time for production of 1 maritime vessel at the Gheorghiu-Dej Shipyard is reportedly 8 months. 47/ On the assumptions that all 14 building ways were devoted to production of the same type of vessel and that a 1-shift, 48-hour-week operation for labor was in effect, annual production of 21 vessels, or about 25,000 GRT, valued at 191 million forints ($14.7 million) is possible. In comparison, production during 1955 at this shipyard was about 15,000 GRT, valued at 140 million forints ($10.8 million). The product mix in 1955, however, included both maritime vessels and floating cranes.

2. Obuda Shipyard.

a. Locale and History.

The Obuda Shipyard is located on the west side of the southern end of Margit Island, in the Third District of Budapest. This shipyard was owned by Austrian interests before 1939. After 1945 the USSR took over the shipyard and subsequently turned it over to the Hungarian government in June 1952.

b. Biographical Data.

The following persons were identified at the Obuda Shipyard in late 1955 48/:

Name	Position
Borka, Attila	Director
Hausser, Adorjan	Chief Engineer
Papp, Laszlo	Chief of Construction
Szasz, Ferenc	Chief Technologist
Kovacs, Istvan	Chief of Personnel

50X1

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Names or Type	Main Characteristics	Remarks
Dunay, Irtysh, Sheksna, Pechora, Sukhona, Kolyma, Midia, Sulina, Mangalia, Constantsa	Tonnage, 544 to 622 GRT Length, 189 to 197 feet Beam, 28 to 30 feet Draft, N.A. Speed, 8 to 16 knots Propulsion, diesel Power, 800 estimated hp	Cargo type. Ten vessels were built during 1947-51. The Dunay, the Irtysh, the Sheksna, the Pechora, the Sukhona, and the Kolyma were exported to the USSR. The Midia, the Sulina, the Mangalia, and the Constantsa were exported to Rumania.
Inland paddle wheel passenger vessel	Tonnage, 450 full load displacement tons* Length, 236 feet Beam, 51 feet Draft, 4 feet Speed, 10 knots Propulsion, steam** Power, 450 hp	It is estimated that 33 of these vessels were built by the end of 1955.
Inland paddle wheel tug	Tonnage, 280 full load displacement tons Length, 187 feet Beam, 57 feet Draft, 3.5 feet Speed, 9 knots Propulsion, steam Power, 400 hp	It is estimated that 76 of these tugs were built by the end of 1955.

e. Labor.

Figures for labor at the Obuda Shipyard during 1947-55 have been interpolated as follows.

* Full load displacement tonnage of a surface vessel is the number of tons (in tons of 2,240 pounds) of water displaced by the vessel afloat, fully loaded, including all equipment, outfit, crew and their effects, fresh water, provisions, fuel, and all other items necessary for the operation of the vessel.
** These steam engines are produced within the shipyard.

Year	Employees
1947	1,500
1948	1,700
1949	1,900
1950	2,100
1951	2,250
1952	2,450
1953	2,600
1954	2,800
1955	3,000

In 1955, 60 percent of labor was skilled, 40 percent unskilled; 95 percent was male, and 5 percent female. The female employees were mostly skilled workers such as machine operators and welders.

The Obuda Shipyard, like the Gheorghiu-Dej Shipyard, also has trouble with increased labor norms. In the summer of 1955 the regime decreed an increase in the labor norms for certain types of employees. At the same time the payroll allotment of the shipyard was reduced by 30 percent. The increase in labor norms did not bring about a reduction in wages, because the employees concerned showed an increase in their norms by submitting faked records of production. They received the same salaries, but on paper they worked faster and wasted less time.

Petty theft and corruption seem prevalent at the Shipyard.

[redacted] 50X1

f. Maximum Capability for Production.

On the assumptions that all 12 building ways at the Obuda Shipyard were used for construction of inland passenger vessels and inland tugs, on the basis of 6 ways for each type, and that each type required 4 months to be produced, the shipyard could construct 18 passenger vessels and 18 tugs annually. This production is the equivalent of 15,300 hp (8,100 hp of passenger vessels and 7,200 hp of tugs),

valued at about 275 million forints ($21.2 million). In comparison, 1955 production at this shipyard of the same types of vessels was valued at 183 million forints ($14.1 million), or about 67 percent of value of maximum capability.

3. Minor Shipyards.

a. Balatonfured Shipyard.

The Balatonfured Shipyard is on the northwestern shore of Lake Balaton, in western Hungary, isolated from the town of Balatonfured. The shipyard possibly has 1 marine railroad and 3 small building ways of unknown dimensions. 53/ Modernization and construction of new building facilities were in progress during 1956, and a new building way and a covered assembly area were reported under construction. The cost of the building way is reported at 5 million forints ($380,000). 54/

This shipyard has built lake passenger vessels, pontoons, aluminum sailboats, "spray boats" for agriculture, and inland patrol craft for the Hungarian and Polish armies. Some consumer goods such as refrigerators and motorcycle sidecars have also been made here. 55/ Planned production under the original Second Five Year Plan (1956-60) included 40 barges with cargo carrying capacities of 1,000 metric tons. 56/ Production during 1956 is reported to have been 3 small passenger vessels and 8 barges. In 1955, about 800 employees worked at this shipyard.

b. Danube Shipyard.

The Danube Shipyard at Vac, on the left bank of the Danube River, about 40 kilometers north of Budapest, has built inland patrol craft for the Hungarian and Polish armies. These craft are the same type as those built at the Balatonfured Shipyard. A total of 28 of these patrol craft were [redacted] at the shipyard in late 1955. 57/ 50X1

The Danube Shipyard has no actual building ways, and construction is done on stocks in the open. In July 1956 a new assembly hall was reported under construction. The shipyard plans to complete during 1956 10 small inland passenger vessels of aluminum. In 1955 this shipyard had about 400 employees.

4. Ship Repair Yards.

The Mahart Ship Repair Yard is the largest and most important of the eight ship repair yards in Hungary.* It is north of the Gheorghiu-Dej Shipyard, on the northeast side of Nep Island. This yard has 2 transverse building ways, each set probably being 250 feet long, and possibly 2 marine railroads. These facilities are used for repairing and reconditioning maritime and inland vessels. No new vessels are built at this yard. It is estimated that this yard employed 800 people in 1955.

* For a list of ship repair yards, see Appendix A.

APPENDIX E

METHODOLOGY

1. Forint-Dollar Ratio.

The estimated cost of constructing a Hungarian vessel of 1,194 GRT is 1955 US $600 per GRT. The development of the cost in 1955 US dollars was determined by averaging the cost of many cargo vessels of various types built in the US during 1943-45. 58/ The types of vessels, cost per ton of light ship displacement, and speeds of the vessels are as follows:

Type of Vessel	Cost (US Dollars per Ton of Light Ship Displacement)	Speed (Knots)
C-1	684	14
C-2	622	15.5
C-3	631	16.5
C-4	667	17
Liberty	524	11
Victory	589	15.3

From these averages a production function of cost per ton of light ship displacement related to speed was established, thus indicating that the cost of a vessel with a speed of 9 knots (similar to the Hungarian type) was 1943 US $500 per ton of light ship displacement. To convert this cost to 1955 US dollars, the following calculation was used:

$$500 \times \frac{236}{135} = 875$$

where

500 = cost in 1943 US dollars,
135 = index of production for 1943 (1939 = 100), 59/
236 = index of production for 1955, 60/ and
875 = cost in 1955 US dollars per ton of light ship displacement.

Cost per ton of light ship displacement times 0.68 is cost per GRT. Therefore, 875 times 0.68 is approximately 1955 US $600 per GRT.

The forint-dollar ratio of 13 to 1 was determined by dividing the Plan cost (7,605 forints per GRT) by the estimated US dollar cost ($600 per GRT), resulting in a ratio of 13 to 1 for the shipbuilding industry. No directly comparable dollar values were available; and, indeed, few if any vessels of this type have been built in the US in recent years.

2. Costs Used to Value Production.

The costs used to value all types of vessels produced in Hungarian shipyards are shown in Table 14.*

The costs of maritime vessels, floating cranes, inland tugs, inland passenger vessels, and inland patrol craft shown in Table 14 were obtained from price lists of 1953. 61/

Costs of small passenger vessels (none completed at the end of 1955) are based upon an East German cost converted to US dollars for a similar vessel ($733,500). 62/ This cost was converted into forints on the basis of the forint-dollar ratio of 13 to 1. Costs of barges are derived from data supplied by US builders ($105 per DWT) and converted into forints on the basis of the forint-dollar ratio of 13 to 1.

3. Value of Production by Belgium During 1955.

The shipbuilding industry of Hungary was compared with the shipbuilding industry of Belgium on a value basis because Belgium is the

* Table 14 follows on p. 49.

Table 14

Costs Used to Value Production
by the Shipbuilding Industry of Hungary
1946-55

Type of Vessel	Size	Costs	Remarks
Maritime vessel	544 to 1,194 GRT a/	7,605 forints per GRT b/	
Floating crane (100-ton capacity)	714 GRT	12,170 forints per GRT	Self-propelled.
Floating crane (5-ton capacity)	300 GRT	9,650 forints per GRT	Non-self-propelled.
Inland tug	400 hp c/	4,250,000 forints per tug	Steam, paddle wheel.
Inland passenger vessel	450 hp	11,000,000 forints per vessel	Steam, paddle wheel.
Inland passenger vessel	450 hp	9,535,500 forints per vessel	Diesel.
Inland passenger vessel	110 hp	2,330,900 forints per vessel	Diesel.
Inland patrol craft	360 hp	850,000 forints per craft	
Barges	1,000 DWT d/	1,365,000 forints per barge	Non-self-propelled.

a. Gross register tons.
b. A forint-dollar ratio of 13 to 1 was used for the shipbuilding industry. For an analysis of this ratio, see 1, above.
c. Horsepower.
d. Deadweight tons.

only Western country with about the same number of employees and shipyards. The analogy is far from perfect, however, because the Belgian shipbuilding industry is engaged in construction and repair of large maritime vessels and because shipbuilding is probably more important to the economy of Belgium than the Hungarian shipbuilding industry is to the economy of Hungary. It is necessary, therefore, that the comparison be used with caution because it is valid only in general terms.

In 1954, Belgium produced 97,300 GRT valued at $48 million, or $493 per GRT. 63/ In 1955, Belgium produced 83,510 GRT. The value for this tonnage was not given. 64/ In 1955 the value of production, based on $493 per GRT, equaled $41 million. To this figure was added 6.6 percent* to account for the increase in building costs between 1954 and 1955. 65/ The resulting figure of $43.7 million was divided by 82 percent (the estimated difference in cost between the figures for Belgium and the US).** Thus the value of Belgian shipbuilding in 1955 in terms of US costs equaled $53 million plus $21 million for ship repair, or a total of $74 million.

4. Value of Ship Repair by Hungary.

a. During 1955.

Total labor for production in 1955 = 7,200 workers.
Direct labor for production in 1955 = 0.8 x 7,200 = 5,760 workers.
Cost of direct labor per year in 1955 = direct labor times average monthly wage times 12 months (5,760 x 900 forints x 12) = 62,208,000 forints.
Total value of production in 1955 = 357,900,000 forints.

$$\frac{\text{Direct labor cost}}{\text{Value of production}} = \frac{62,208,000}{357,900,000} = 0.174$$

* This figure is the increase in costs in the Netherlands between 1954 and 1955. The figure for the increase in costs in the shipbuilding industry in the Netherlands was applied to the shipbuilding industry in Belgium because information from the US Maritime Administration indicated a similarity in the increases in costs of shipbuilding in both countries.
** This resulting figure is based on information from the US Maritime Administration indicating that the ratios of Belgian and Netherland costs to US costs are approximately equal, the Netherland costs being 82 percent of US costs. 66/

In the US, cost of direct labor for production = 0.27 of total cost. 67/
In the US, cost of direct labor for repairs = 0.35 of total cost. 68/
The assumption that the ratio between cost of direct labor for repairs and for production in Hungary is the same as in the US gives the following:

Labor cost for repairs in Hungary = $\frac{0.174 \times 0.35}{0.27}$ = 0.226 of total cost.

Total labor for repairs in Hungary in 1955 = 1,300 workers.
Direct labor for repairs in Hungary in 1955 = 0.70 x 1,300 = 910 workers.
Total cost of direct labor for repairs = direct labor times average monthly wage x 12 months (910 x 900 forints x 12) = 9,830,000 forints.

Total value of repairs in Hungary in 1955 = $\frac{9,830,000}{0.226}$ = 43,000,000 forints.

Value of production in 1955 = 357,900,000 forints = 89.3 percent.
Value of repairs in 1955 = 43,000,000 forints = 10.7 percent.
Total value of production of the shipbuilding industry in Hungary in 1955 = 400,900,000 forints ($30,840,000) = 100.0 percent.

b. During 1947.

Total labor for repairs in Hungary in 1947 = 720 workers.
Direct labor for repairs in Hungary in 1955 = 0.70 x 720 = 500 workers
Total cost of direct labor for repairs = direct labor times average monthly wage times 12 months (500 x 900 forints x 12) = 5,400,000 forints.

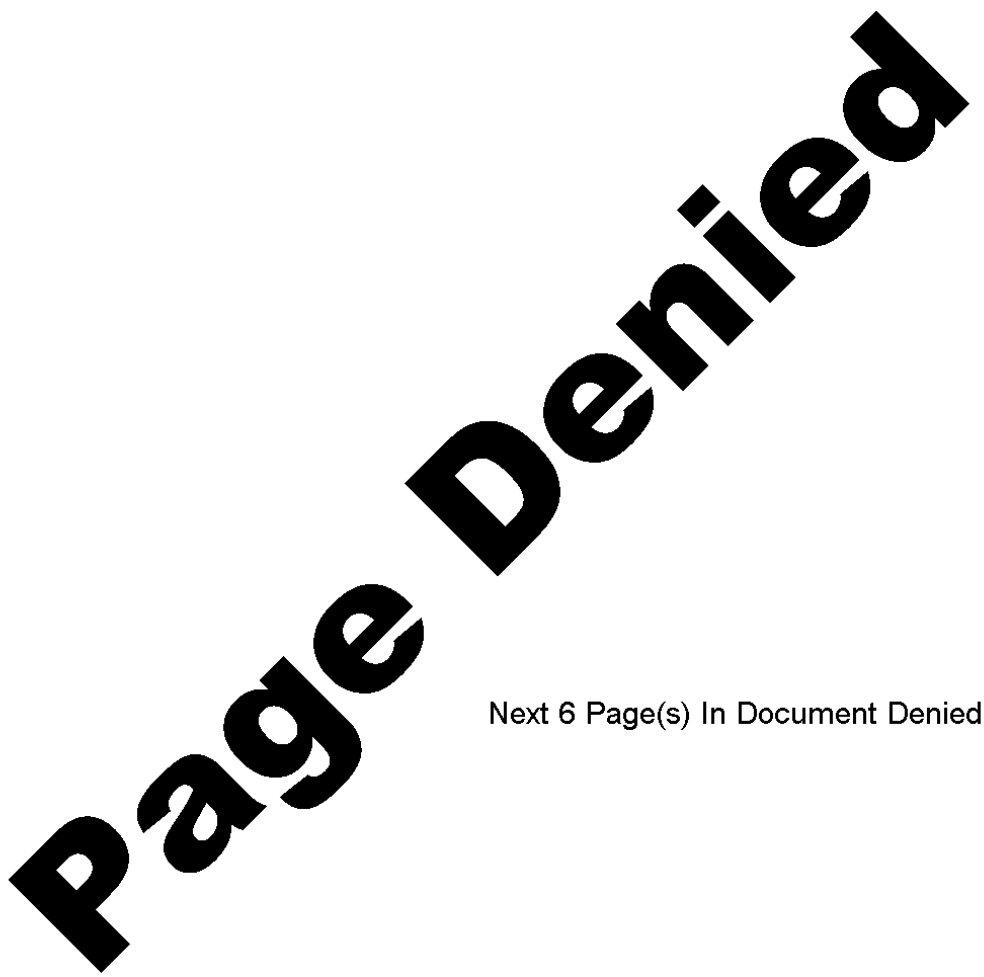
Total value of repairs in Hungary in 1947 = $\frac{5,500,000}{0.226}$ = 24,000,000 forints ($1,800,000).

Between the figures for 1947 and 1955 a straight line interpolation, which supplied the estimated value of ship repairs for the intervening years, was made. A continuation of this interpolation provided the value for 1946.

5. Value of Production by Hungary During 1956-60.

The value of production in 1955 = 357,900,000 forints.
The value of exports in 1955 = 90 percent of 357,900,000 or 322,100,000 forints.
It is estimated that by 1960 the volume of foreign trade will increase by 40 percent over that in 1955. 69/
In 1960 the volume of foreign trade = 450,900,000 forints.
Under the original Second Five Year Plan (1956-60), Hungary was to construct vessels for domestic use valued at 281,000,000 forints.
Average yearly value of vessels to be retained by Hungary = 56,200,000 forints.
Total value of production in 1960 = total value of vessels produced for foreign and domestic use (450,900,000 + 56,200,000 forints).
Value of production in 1960 = 507,100,000 forints ($39,000,000).

Points on the graph for the value of production in 1955 and 1960 were plotted, and a straight line interpolation gave the value of production for intervening years.



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