ARAB REPUBLIC OF EGYPT
REPORT ON THE TECHNICAL COOPERATION PROGRAM
TO
THE SUEZ CANAL AUTHORITY
(THE SECOND YEAR)

FEBRUARY 1980

JAPAN INTERNATIONAL COOPERATION AGENCY

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PREFACE

In accordance with the agreement between the Government of Japan and the Government of the Arab Republic of Egypt, the Japan International Cooperation Agency (JICA) has been extending technical cooperation to the "Economic Unit" in the Planning and Research Department, the Suez Canal Authority.

Following the practice in the preceding year JICA organized in 1979 which is the second year of the 3-year program a Steering Committee chaired by Professor Yoshimi Nagao of Kyoto University and a survey team comprising experts from the Mitsubishi Research Institute and the Japan Maritime Research Institute, and dispatched the team to the Suez Canal Authority in Ismailia.
In addition, JICA has trained in Japan seven staff members of the Suez Canal Authority for a period of three months. The team has compiled the present report as a result of the survey conducted this year.

This report deals with the standard techniques of system analysis and forecasting necessary for the management and planning of the Suez Canal.

I hope this report will prove to be useful for the further expansion of the Suez Canal, the promotion of economic development of Egypt and for the promotion of friendly relations between our two countries.

I would like to express my heartfelt appreciation to the officials concerned of the Government of Egypt and the Suez Canal Authority for their valuable cooperation extended to the Survey Team.

February 1980

Keisuke Arita

Keisuke Arita
President
Japan International Cooperation Agency

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PART I

SUMMARY

SUMMARY

A technical cooperation program between the Governments of Japan and the Arab Republic of Egypt, carried out since 1978, has been assisting the Suez Canal Authority. The program, under the basic agreements of the Scope of Work concluded between Japan International Cooperation Agency and the Suez Canal Authority, has studied the organizational tasks and the systems analysis required for the newly established Economic Unit of the Planning and Research Department (hereinafter referred to as the Unit).

A study of the organization and the function of the Unit, and a basic study of systems analysis, had been carried out last year, while this year's study mainly concerns systems analysis. This report summarizes the results of the systems analysis study. The purpose of the study is to train the staff of the Unit in the techniques and the knowledge necessary in the performance of its duties. The following study items were included, based upon the results of last years efforts:

(1) Continuing the work of the first year, an analysis of the current traffic trends, and short-term forecasting of the most pressing tasks of the Planning and Research Department, will be conducted using analysis techniques of greater sophistication.

(2) Long-term forecasting models of Canal traffic proposed in the fiscal year 1978, will be developed into models of higher level.

(3) Techniques will be proposed for the collection and the management of data and information required for these analysis and forecasts.

For item (1), it was intended that factors such as the economic and shipping situations of the Suez Canal, the Canal traffic, transportation costs, and all other considerations in forecasting the Canal traffic, be analyzed and thoroughly understood by the unit. These analyses are intended to constitute the basis of the traffic forecasting system; althought this subject was studied last year, now its scope has been widened, and the analyses have been performed with more sophistication and accuracy.

For the short term forecasting of the canal traffic, revised and expanded model has been made, in order to obtain more results, and to make possible more detailed analysis.

For item (2), the long term forecasting model for tanker traffic presented last year has been extended to incorporate the shipping market and a advanced route choice model. A basic model for long term forecasting of non-tanker traffic has also been presented.

For item (3), methods of collecting and preparing information and data are described for use in the study of current trend analysis, and for the forecasting of Canal traffic.

Additional studies have been made on these subjects, and their results are arranged as follows:

I. Summary
II. Introduction
III. Analysis of Current Tends and Transportation Costs
IV. Short Term Forecasting of Canal Traffic

V. Long Term Forecasting of Tanker Traffic through the Suez Canal
VI. Long Term Forecasting of Non-Tanker Traffic through the Suez Canal
VII. Other Studies

The respective parts are outlined below.

PART III ANALYSIS OF CURRENT TRENDS AND TRANSPORTATION COSTS

Presents a report on Analysis of Current Trends of "the Maritime Environment surrounding the Suez Canal" and an "Analysis of Maritime Transportation Costs" among those items pertaining to the secondary survey on system analysis and information management concerning the technical cooperation program for the Suez Canal Authority of the Arab Republic of Egypt.

This part consists of six chapters: Chapter I Introduction; Chapter 2 World Economy and International Trade; Chapter 3 Demand and supply of ship tonnage and the markets; Chapter 4 Suez Canal traffic; Chapter 5 General cargo (other goods) and liner fleet (container fleet relating to the Suez Canal); and Chapter 6 Analysis of maritime transportation costs. In this secondary report, it can be particularly mentioned that itemwise analyses of major cargoes transiting through the Suez Canal are conducted in Chapters 4 and 5 and a study on container fleet also given in Chapter 5.

Chapter 1, Introduction, introduces the characteristics and objectives of the report in this part, as well as the contents, etc. in respective chapters.

Chapter 2, World economy and international trade, presents a guidance the analyze the world economy which gives effects to the Canal traffic. This chapter mainly studies the economy of the developed countries in 1978 as a part of the world economy in considering national currency exchange rate, international balance of payment and especially economic policy.

Chapter 3, Demand and supply of ship tonnage and the markets, presents and analysis of such items by classifying cargoes into the two fields of petroleum and petroleum products, and dry bulk cargo. In regards to petroleum and petroleum products, an analysis is particularly made of the situation involving oil problems such as consumption and production of oil, etc. In addition, a study on demand and supply balance in the two sectors of oil and major dry bulk cargoes and the markets of the two sectors are given in taking into consideration to suspension, abolition, loss and building of ships by types including how to deal with oil/bulk combined carriers.

In Chapter 4, Suez Canal traffic, the Canal traffic for the past three years since 1976 is analyzed on the basis of items in regard to the types of ships and main cargoes by types of commodities and directions, and the trade trend analysis by commodities in the pertinent regions is also analyzed with particular emphasis on dry bulk cargo.

Chapter 5, General cargo (other goods) and liner fleet (container fleet relating to the Suez Canal), the goods (general cargo) other than the cargoes described in the Chapter 4 are analyzed as a part of the itemwise analysis of dry bulk given in the preceding chapter. In addition, a study relating to container ships is also given, but detail survey data is omitted because it is much and intricacy.

Chapter 6, Maritime transportation costs, analyzes the feasibility of the Canal traffic after completion of the First-Stage Development Project for transportation by large bulk carriers, particularly for iron ore and coal, including some supplementary descriptions concerning tankers subsequent to the analysis following after last year's studies on tankers.

PART IV SHORT TERM FORECASTING OF CANAL TRAFFIC

Part IV describes the methods of short term forecasting of the canal traffic, and the revenue from the Canal.

Chapter 1, "Introduction" describes the objectives and the outline of the Study.

Chapter 2, "Method of Forecast" describes the procedures for forecasting Canal traffic and revenue. According to the methods adopted herein, the volume of international trade first is forecast with respect to the important commodities for the canal; then, the Canal traffic share of these commodities is examined; and, on the basis of these factors, the cargo traffic through the Canal is forecast. Based upon the cargo traffic forecast, the number of ships passing through the Canal on the basis of the types of ships and their cargo capacities, is obtained. From this number, the Canal revenue is calculated.

In Chapter 3, a case study is made 1980 traffic, and the expected income in 1980, are forecast on the basis of international trade and Canal traffic data presently available.

Chapter 4, "Statistical Analysis of Shipping Arrivals", presents an attempt to approximate the ship arrival pattern by Posisions Distribution, based on actual data collected from the Suez Canal.

PART V LONG TERM FORECASTING OF TANKER TRAFFIC THROUGH THE SUEZ CANAL

This part summarizes the long-term forecasting system of tanker traffic through the Suez Canal. The improved route choice model and shipping market model are incorporated in to the basic system proposed last year, as an improvement and expansion of the basic model.

Chapter 1, "Introduction" describes the contents of Part V.

Chapter 2, "Forecast Method", explains the general forecasting process when considering the freight market.

Chapter 3, "Oil Trade Flows Relevant to the Suez Canal", describes the forecasting of oil trade flows passing through the Suez Canal, based on the levels agreeded to at the Tokyo Summit Meeting.

Chapter 4, "Route Costs", introduces the concept of freight cost, which should be used instead of shipping costs, and explains the method of determining the freight costs.

Chapter 5, "Route Choice Model", considers the use of the multinominal choice model to proportion the Suez Canal related round-trip voyages.

Chapter 6, "Forecast of Tanker Transit", shows an actual forecast of tanker transits, based on actual data.

PART VI LONG TERM FORECASTING OF NON-TANKER TRAFFIC THROUGH THE SUEZ CANAL

Part VI summarizes a basic system for long term forecasting of non-tanker traffic through the Suez Canal.

Non-tanker traffic through the Suez Canal is considered to be more important than tanker traffic to SCA after the completion of the first phase expansion project of the Suez Canal, for the following reasons:

First, tanker traffic is expected to increase when the first phase Suez Canal expansion project is completed; subsequently, it is forecast that tanker traffic and future oil trade flows from the Arabian Gulf will not increase because of OPEC's policy. On the other hand, it is considered that non-tanker traffic will increase with the world's economic development.

This part consists of the following four chapters:

Chapter 1, "Introduction", clarifies the objectives of long term forecasting for non-tankers, and describes how to use the forecasting system.

Chapter 2, "World Economy and Dry Cargo Trade", describes the procedures used for forecasting dry cargo trade flows carried by non-tankers. Two methods (A and B) are explained in this chapter. Method A is often used to forecast major bulk cargo carried by bulk carriers. Method B is simpler and more practical than method A, and can be used to forecast not only other bulk cargo and general cargo trade flows but also major bulk cargo.

Chapter 3, "Non-Tanker Traffic Through the Suez Canal", describes methods of forecasting non-tanker traffic passing through the Suez Canal. Two methods are explained in the same manner as in Chapter 2.

Chapter 4, "Canal Revenue from Non-Tankers", clarifies the methods of forecasting Canal revenue at a given level of the tariff per ship.

The systems analysis technique in this part provides basic data for determining the scope and timing of the Canal's development projects as well as tariffs in the future.

PART VII OTHER STUDIES

In this part, questions of operating the canal and of a technical nature are briefly discussed on the basis of the existing feasibility study report, so that the staff of the Unit will be familiar with potential problems.

PART II

INTRODUCTION

INTRODUCTION

1. Objectives

A technical cooperation program between the Governments of Japan and the Arab Republic of Egypt, carried out since 1978, has been assisting the Suez Canal Authority. The program, under the basic agreements of the Scope of Work concluded between the Governments, has studied the organizational tasks and the systems analysis required for the newly established Economic Unit of the Planning and Research Department (hereinafter referred to as the Unit).

A study of the organization and the function of the Unit, and a basic study of systems analysis, had been carried out last year, while this years study mainly concerns systems analysis.

2. Scope

This report summarizes the results of the systems analysis study. The purpose of the study is to train the staff of the Unit in the techniques and the knowledge necessary in the performance of its duties. The following study items were included, based upon the results of last years efforts:

(1) Continuing the work of the first year, an analysis of the current traffic trends, and short-term forecasting of the most pressing tasks of the Planning and Research Department, will be conducted using analysis techniques of greater sophistication.

(2) Long-term forecasting models of Canal traffic proposed in the fiscal year 1978, will be developed into models of higher level.

(3) Techniques will be proposed for the collection and the management of data and information required for these analysis and forecasts.

For item (1), it was intended that factors, such as the economic and shipping situation of the Suez Canal, the Canal traffic transportation costs, and all other considerations in forecasting the Canal traffic, be analyzed and thoroughly understood by the Unit. These analyses are intended to constitute the basis of the traffic forecasting system; although this subject was studied last year, now its scope has been widened, and the analyses have been performed with more sophistication and accuracy.

For the short term forecasting of the canal traffic, revised and expanded model has been made in order to obtain more realistic results, and to make possible a more detailed analysis.

For item (2), the long term forecasting model for tanker traffic presented last year has been extended to incorporate shipping market and a advanced route choice model. A basic model for long term forecasting of non-tanker traffic has also been presented.

For item (3), methods of collecting and preparing information and data are described for use in the study of current trend analysis, and for the forecasting of Canal trafic.

3. Contents of the Study

According to the scope of the study, these subjects and their results have been arranged as as follows:

I. Summary
II. Introduction
III. Analysis of Current Trends and Maritime Transportation Costs
IV. Short Term Forecasting of Canal Traffic
V. Long Term Forecasting of Tanker Traffic through the Suez Canal
VI. Long Term Forecasting of Non-Tanker Traffic through the Suez Canal
VII. Other Studies

4. Organization for the Implementation of the Technical Cooperation Program

(1) Steering Committee

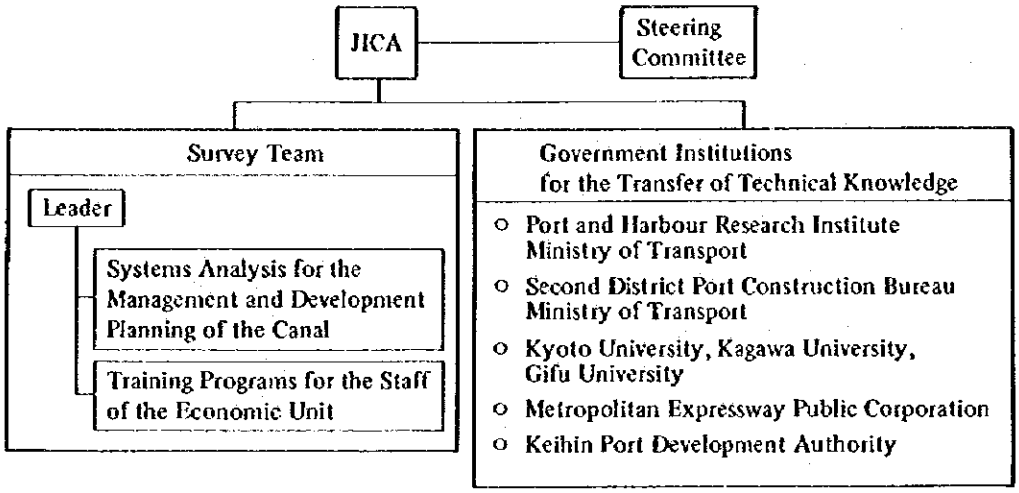
For the successful implementation of the technical cooperation program, a Steering Committee was established by the Japan International Cooperation Agency (JICA), as an advisory body to the Chairman of the JICA. The members of the Committee are of follows:

Members of Steering Committee

Dr. Yoshimi Nagao, Chairman	Professor of Engineering, Kyoto University
Yoshiro Haraguchi	Managing Director, Hanshin Port Development Authority
Akira Otake	Special Assistant to the Director of the Division International Affairs Division, Minister's Secretariat, Ministry of Transport
Hiromichi Matsumoto	Deputy Director, Overseas Division, Bureau of Shipping, Ministry of Transport
Shuichi Soda	Deputy Director, Construction Division, Bureau of Port and Harbours, Ministry of Transport
Yasuhide Okuyama	Chief, Systems Laboratory, Port and Harbour Research Institute Ministry of Transport
Michio Takahashi	Director of Planning Division, The Third Port Construction Bureau, Ministry of Transport

The Committee has provided advice to the Survey Team for the technical cooperation program, whose members include staff members of the Mitsubishi Research Institute and the Japan Maritime Research Institute. The Committee has aided the program by inspecting and guiding the

plans and the products prepared by the Survey Team. The organization for the implementation of the program is shown below.



Organization for the Implementation of the Technical Cooperation Program

(2) Dispatch of Field Survey Teams

In order to meet the specific needs of the technical cooperation program, field survey teams were dispatched to the SCA for studies on the systems analysis techniques for the management and development planning of the Canal, and for the training programs of the staff of the Unit.

A. Survey team (I)

1) Period: July 3 ~ August 14, 1979 (43 days)

2) Purpose:
- Explanation of the systems analysis report of 1978
- Supplementary lecture on the problems raised in February, 1979
- Collection of data, information and opinions of the SCA officials
- Consultation on the production of research output
- Recommendation of the candidates for training in Japan

B. Survey team (II)

1) Period: November 8 ~ 24, 1979 (21 days)

2) Purpose:
- Consultation on the production of research output to the remaining staffs
- Collection of data, information, and opinions of the SCA officials

C. Survey team to explain the draft final report

1) Period: February 14 ~ 27, 1980 (14 days)

PART III

ANALYSIS OF CURRENT TRENDS AND TRANSPORTATION COST

CHAPTER 1 INTRODUCTION

Part III gives a report, following that of last year, on "Analysis of the Maritime Environment Relative to the Suez Canal" and "Maritime Transportation Cost Analysis" which relate to systems analysis and information management concerning the survey on the technical cooperation program for the Suez Canal Authority of the Arab Republic of Egypt.

The main purpose of this study was to analyze the relationship of the Canal transit of the main commodities regarded as being important to the Suez Canal, taking into account international trade and the actual transit data of the Canal.

In conducting this study, the general situation was that there are not available statistical data which cover shipping on the global basis. However, effort was made to gather related isolated data and to link them up. At the same time, trial calculations and estimates were made on statistical data which were lacking.

Part III consists of six chapters including this one. Chapter 1 is Introduction, Chapter 2 World Economy and International Trade, Chapter 3 Demand and Supply of Ship Tonnage and Shipping Market, Chapter 4 Suez Canal Traffic (Analysis of Ship Traffic and Main Cargoes by Type of Commodities), Chapter 5 General Cargo and Linear Fleet (Container Fleet Relative to the Suez Canal), and Chapter 6 Maritime Transportation Cost Analysis.

Chapter 2 World Economy and International Trade is concerned mainly with an economic analysis of the developed countries which exert a big influence on the world economy. With respect to the Suez Canal, the economic trends in the Middle East countries and the newly industrializing countries of Asia have an important bearing on southbound cargo which has been showing a remarkable increase in recent years.

Furthermore, the economic trends in the countries of Eastern Europe, aside from the U.S. and European countries mentioned above, have an important bearing on northbound cargo whose growth has tapered off. Consequently, the economic trends in these countries have also been touched upon briefly. Regarding the economy of the developed nations, while giving an overview of the economic growth of the seven major nations (real growth in 1978 4.2%; including other OECD nations 2.3%; total 3.9%), reference is made to their domestic and external demand situation, price trends, employment situation, and the relation between their balance of international payments and exchange rates. Mention is also made of the domestic and foreign economic policies of the countries and international cooperation.

In Chapter 3 Demand and Supply of Ship Tonnage and Shipping Market, the analysis is conducted by dividing into the two categories of oil and petroleum products on the one side and dry cargo on the other. With respect to oil and petroleum products, the energy situation, such as the consumption of oil and production, is analyzed and a trend of supply-demand balance of tankers by size (including combined carriers) is examined while taking into consideration idle, dismantled, lost and newbuilding tonnage. The tanker market, too, is touched upon. With respect to dry cargo, a similar analysis is made of the tonnage supply-demand relationship while conducting an overview of the seaborne trades of the main bulk cargoes on individual commodity basis.

The tramp market, too, is surveyed in general.

In Chapter 4 Suez Canal Traffic (Analysis of Main Cargoes by Type of Commodities), an analysis is conducted of the ships and cargoes which transit through the Suez Canal and their characteristics are studied. With respect to ships passing through the Canal, a comparative analysis of ship types is conducted and a trend towards their size-up is taken up, too. With respect to cargo traffic, a background analysis is conducted of the world import-export situation concerning the main cargoes (seven types of commodity). Their relationship with cargoes passing through the Canal was analyzed.

Chapter 5 General Cargo and Liner Fleet (Container Fleet Relating to the Suez Canal) is a part of the analysis of ships and cargoes which transited the Suez Canal in the preceding Chapter, particularly an analysis of the main cargoes by type of commodity. It was decided, however, to devote a separate chapter to liner shipping which has the highest share of Suez Canal traffic. Consequently, it should be noted that "general cargo" as referred to in this chapter is the overall term for "other goods" aside from the seven types of commodities analyzed in Chapter 4.

The "other goods" is the field in which clear statistical data on the global basis is least available. Consequently, efforts were made to estimate the total volume by conducting trial calculations in part. The relationship of "other goods" to Suez Canal traffic is analyzed and related information regarded as important was appended. This chapter also gives a general review of the world container fleet and containerized shipping routes (32 routes). On eight of these routes via the Suez Canal are also reviewed.

With regard to Chapter 6 Maritime Transportation Cost Analysis, the analysis in the previous year dealt intensively with the tanker. This year, in this chapter, the tanker cost analysis is supplemented with three points: an analysis of the effect on the market of the rise in the fuel oil price, an analysis of the New World Scale Rates which went into effect in January 1980, and an analysis of the economical effectiveness of using the Canal when part laden.

Regarding non-tankers, in this year's cost analysis, the cases taken up were those of a 130,000-ton bulk carrier (meets draft limit of 53 feet of the First Suez Development Program) transporting iron ore (high proportion of large size ships) in Australia/Europe and India/Europe trades and that of the possibility of coal transport through the Canal in the Australia/Europe trade (similarly with respect to a large 130,000-ton bulk carrier especially in relation to the Suez Canal). In this trade, however, the proportion of large size ships is small. Reference is also made to the profitability analysis of 60,000-ton ships in transporting bauxite in the Australia/Europe trade. Also taken up was grain transport in the U.S./India trade. In all of these five cases, analyses were conducted on the economic costs (including relation to the market) of transport via Suez and via Cape.

CHAPTER 2 WORLD ECONOMY AND INTERNATIONAL TRADE

2.1 General

In the past economic growth and the volume of maritime cargo transporation were closely interrelated. The coefficient of elasticity in the case of crude oil (on a ton-mile basis), for example, used to be very high at 2.14 until 1965-75. However, the world economy plunged into a recession in the wake of the 1973 oil crisis. The maritime trade turned sluggish, the freightage fell and all incentives for new shipbuilding orders were lost, putting most shipbuilding nations in serious difficulties. In 1978, the world shipping market turned somewhat buoyant, as the economies of Japan and Western Europe recovered, though slowly, following the pickup in the U.S. economy. The volume of ships' tonnage through the Suez Canal, particularly cargoes hauled southward, was known to have increased in keeping with a rise in the tanker rates after the autumn of 1978. This indicates that an analysis of shipping trade, involving the volume of cargo transportation through the Suez Canal, must be based on an accurate picture of world economic developments.

Before we try to analyze the problems facing world shipping, we shall review in this chapter how the economies fared in 1978 particularly in the industrialized nations and how the world trade was affected by the balance of payments performances in major countries and turbulences on the foreign exhange markets. We shall also try to foresee the future course of the world economy and study the features of economic policies pursued by individual countries in hopes of providing relevant data, on which our analysis of the shipping industry can be based.

The year 1978 saw the economy recover increasingly rapidly in the United States and Western Europe due to active personal expenditure, and in Japan due to brisk domestic demand. However, the process did not develop into a full-fledged expansion led by recovery of corporate equipment investment because of the stringent policies many countries adopted to reduce the balance of payments deficits and contain inflation.

2.2 General Trends of Major Industrialized Economies

In 1978, the major industrialized economies gave performances similar to those they did in the previous year, that is, while the U.S. economy continued expansionary, the European economies kept on recovering hesitantly. In the latter part of 1978, however, the recovery in Europe, particularly West Germany, began to gather momentum whereas the U.S. economy began to show signs of a slowdown.

The U.S. economy went on expanding through much of 1978, boosted by fast personal consumption and corporate investment in equipment. By December that year, the business expansion had lasted for 45 months without interruption – an unusually long spell in peace time. But around the middle of the year, the pace of the expansion began to slow down as the growth of individual consumption decelerated and the effects of the deflationary policies, employed to correct the balance of payments position and curb inflation, came through. In contrast, the European economies entered a phase of general recovery at the beginning of 1978. With stimulous measures of varying degrees taken by individual countries in the background, personal consumption turned firm in keeping with an increase in real income resulting from slower inflation and a rise in nominal wages. Exports also continued generally active. But the business recovery in Western Europe was

slow because corporate investment did not fully pick up. As a result, the 1978 growth of real GNP in seven major OECD countries averaged only 4.2%. The slow recovery in European countries was due mainly to these factors:

Table 2-1 Growth of Real GNP in the OECD Area

	Average 1966–67 to 1976–77	1978
United States	2.8	4.4
Japan	7.8	5.6
Germany	3.6	3.5
France	4.6	3.3
United Kingdom	2.1	3.3
Italy	3.9	2.6
Canada	4.7	3.4
Total of above countries	4.2	4.2
Other OECD countries	4.2	2.3
Total OECD	4.2	3.9

Source: OECD Economic Outlook 26.

(1) The process of recovery lacked momentum because equipment investment remained sluggish as the industry failed to change its cautious stance.

(2) In some of the European countries highly dependent on exports, slow exports in one country adversely affected those in others, which in turn resulted in deterring general business recovery.

(3) Most countries could not but be contented with expansionary measures of only a limited extent under the pressing circumstances. Britain, France and Italy were forced to combat two-digit inflation rates and huge balance of payments deficits. In West Germany, containment of inflation remained the priority policy.

The United States saw a major improvement made in the employment situation in 1977, and the trend continued in 1978. But in Western Europe, the unemployment rates rose in France and Italy in the latter half of 1978. The unemployment rates declined in Britain and West Germany but the growth in the number of employed was extremely slow, indicating the bleak employment situation there.

The price uptrend in the Western countries and Japan generally continued calming down since the middle of 1977, though the rise somewhat sharpened in the latter part of 1978. But the United States and Western Europe presented a market contrast in price performance. In the United States, price rises tended to accelerate in 1978 after remaining relatively slow for some time. In Europe, many countries continued to suffer two-digit inflation, but the general trend was definitely toward deceleration. (West Germany and Japan were most successful in combating inflation, with price rises running at 3~4% in 1978.) In Japan and Western Europe, wage cost put considerable pressure to bear on prices, but because of generally slow business recovery, demand continued sluggish and manufacturers could hardly boost the price of their products. In West

Germany and Japan, the firmness of their currencies against the U.S. dollar kept the prices of primary products relatively stable and pushed the import prices downward. But in the United States, price increases accelerated to reach 7% at an annual rate in 1978 – one of the highest in recent years. In addition to the sharp rises in food prices caused by the bad weather in eary 1978, the demand pressure kept on building up amid the continuing business expansion. The dollar's relative weakness also led to higher import prices.

Table 2-2 Adjusted Unemployment Rates in Selected OECD Countries
Per cent of total labour force, seasonally adjusted

	Average 1964–1973	Average 1974–1978	1977	1978	1978 Q1	1978 Q2	1978 Q3	1978 Q4	1979 Q1	1979 Q2	1979 Q3
United States	4.4	6.8	6.9	5.9	6.1	5.9	5.9	5.7	5.6	5.6	5.7
Japan	1.2	1.9	2.0	2.2	2.1	2.2	2.3	2.3	2.0	2.1	2.2
Germany	(0.7)	(3.2)	(3.6)	(3.5)	(3.6)	(3.6)	(3.5)	(3.4)	(3.3)	(3.1)	(3.0)
France	(2.2)	4.3	4.9	5.2	(4.7)	(5.0)	(5.4)	(5.4)	(5.6)	(6.0)	(6.1)
United Kingdom	(3.1)	(4.9)	(6.1)	(6.1)	(6.3)	(6.2)	(6.1)	(5.9)	(6.0)	(5.8)	(5.6)
Italy	5.5	6.4	7.1	7.2	7.2	7.1	7.2	7.2	7.6	7.6	8.0
Canada	4.9	7.1	8.0	8.3	8.3	8.4	8.3	8.1	7.9	7.6	7.1
Australia	1.8	4.8	5.6	6.4	6.7	6.3	6.3	6.1	6.3	6.3	6.2
Finland	2.3	4.2	6.0	7.4	7.6	7.2	7.3	7.5	6.9	5.9	5.7
Norway	(1.8)	1.8	1.5	1.8	1.9	1.4	2.1	2.0	2.3	2.0	1.9
Spain	1.8	4.9	5.5	7.3	6.9	7.0	7.5	8.0	8.5	8.4	9.1
Sweden	2.0	1.8	1.8	2.2	2.1	2.3	2.5	2.0	2.1	2.3	2.1
Total	(3.0)	(4.9)	(5.3)	(5.2)	(5.2)	(5.1)	(5.2)	(5.1)	(5.1)	(5.1)	(5.1)

Source: OECD Economic Outlook 26.

Table 2-3 Private Investment Performance in Eight OECD Countries

	Average growth of business investment		Share of private machinery and equipment in total private investment (volume)			
	1960–73	1973–78	1960	1968	1973	1978
United States	4.9	0.7	36.9	43.8	44.9	48.0
Japan	14.3	0	50.0	51.7	59.7	55.6
Germany	4.2	–0.2	34.7	39.1	42.9	48.6
France	7.2	0.2	43.6	46.1	50.3	52.5
United Kingdom	4.0	3.5	47.4	46.7	51.3	52.3
Italy	4.6	–1.2	38.8	37.6	46.7	48.0
Canada	6.0	2.4	34.1	37.7	40.0	41.3
Sweden	4.1	–2.8	40.6	41.9	46.3	47.2

Source: OECD Economic Outlook 26.

2.3 Balance of Payments Disequilibrium and Turmoil on Foreign Exchange Markets

The country which made the most spectacular balance of payments improvement was Japan, whose current account surplus swelled to $16,500 million in 1978 from $11,000 million in 1977. European countries generally managed to register surpluses in 1978.

France and Italy, whose currencies fell in value against other European currencies, enjoyed brisk exports to other Common Market countries. This, coupled with the increased earnings from tourism (particularly in Italy), helped a great deal to improve their balance of payments position.

Japan and West Germany had their surpluses increased further on the strength of their unrivaled competitive edge. Lesser European states faced serious deficits and in some of them, problems resulting from the deficit finance came to the surface in 1976. But the stringent demand-curbing measures enforced since the beginning of 1977 began to take effect gradually, notably in Scandinavian countries, and Spain. Their deficits were more than halved in 1978, although the levels were still too large for the sizes of their GNP.

On the other hand, the United States had a record current account deficit in 1977 due mainly to the increased trade shortfall. The current account deficit soared to yet another record in 1978. The bigger U.S. trade deficit in 1978 despite its reduced oil imports was due basically to the gaps in both growth rate and inflation rate between the United States and its major trade partners, which worked to erode its competitive edge. Moreover, the dollar's fall proved to be a minus factor because it aggravated the terms of trade. This in turn resulted in a deterioration of the balance of trade in industrial manufactures.

Table 2-4 Private Consumption Deflators in Seven Major Countries
Percentage changes seasonally adjusted at annual rates

	Average 1965–66 to 1975–76	From **** year 1977	1978
United States	5.2	5.7	7
Japan	8.2	6.4	4
Germany	4.4	3.8	2 ¾
France	6.9	9.5	9 ½
United Kingdom	9.1	14.7	8
Canada	5.5	7.5	8
Italy	8.5	17.0	12
Total of above countries	6.2	7.1	6 ½
Memorandum item Four major European countries	6.6	9.4	7

Source: OECD Economic Outlook, Dec. 1978.

The increased U.S. deficit was to blame largely for the wild fluctuations on foreign exchange markets in 1978, which sometimes threw the world economy into turmoil. The dollar which began to ease in the autumn of 1977, kept on falling almost without interruption until the end of October that year. The decline was particularly steep against such "strong" currencies as the German mark, Swiss franc and Japanese yen. The U.S. monetary authorities put into force a series of dollar-defending measures starting with an increase in the official discount rate in early 1978. Actions implemented later on included another hike in the discount rate, increased gold sales, a cut in the reserve requirement for loans, etc. All these steps failed to stem the persistent selling pressure on the dollar, and the exchange markets remained unsettled. In November that year, the U.S. Government took additional measures, which included (1) tougher monetary controls (a drastic increase in the discount rate from 8.5% to 9.5% and a hike in the reserve requirement ratio for deposits), (2) stepped up market intervention by monetary authorities, and

Table 2-5 Current Balances of Major OECD Countries and Country Groups
$ billion; seasonally adjusted, expressed at annual rates

	1976	1977	1978	1979
United States	4.6	−14.1	−13.9	−2½
Canada	−3.9	−4.0	−4.6	−6
Japan	3.7	10.9	16.5	−7½
France	−6.1	−3.3	3.9	1½
Germany	3.4	4.2	8.8	−1
Italy	−2.8	2.5	6.4	6¼
United Kingdom	−1.5	0.5	2.0	−5½
Total	−2.6	−3.3	19.0	−14¾
Other EEC	0.4	−2.5	−3.9	−7¼
Other North Europe	−5.0	−7.5	0.4	−3
Other OECD	−11.0	−11.5	−6.4	−5
Total OECD	−18.2	−24.8	9.1	−30

Source: OECD Economic Outlook Dec. 1979

(3) increased funds to support market intervention (an expansion of swap arrangements and offering of more securities (denominated in foreign currencies). These measures were welcomed both in the United States and other countries. Upon their announcement, the dollar sharply rebounded against other key currencies. The U.S. Government enforced these drastic dollar-defending measures apparently in view of the adverse effect the dollar's weakness and continued unrest on foreign exchange markets would have on recovery of the world economy and the gorwing inflationary pressure brought about by higher import prices. The significance of the U.S. actions might be far-reaching. They might imply that the United States admitted openly that there was a limit to the effectiveness of the present floating exchange system in correcting the increasingly eminent payments imbalances.

The U.S. actions prompted demand for exchange stability among the European countries, and the Common Market leaders who met in Brussels in early December 1978 agreed to inaugurate the new European monetary system (EMS) at the beginning of 1979.

2.4 Features of Economic Policies Pursued by Countries

One promient point in 1978 was that countries were more enthusiastic than ever to collaborate with each other in achieving their common target – to keep the economy recovering without rekindling inflation. Another feature was that they brought every available domestic means into play, including incomes, employment and industrial policies on top of fiscal and monetary policies.

A frequent use was made of monetary policies to bring about stability to exchange markets. The United States, mindful of the adverse effect the dollar's fall could have on the world economy,

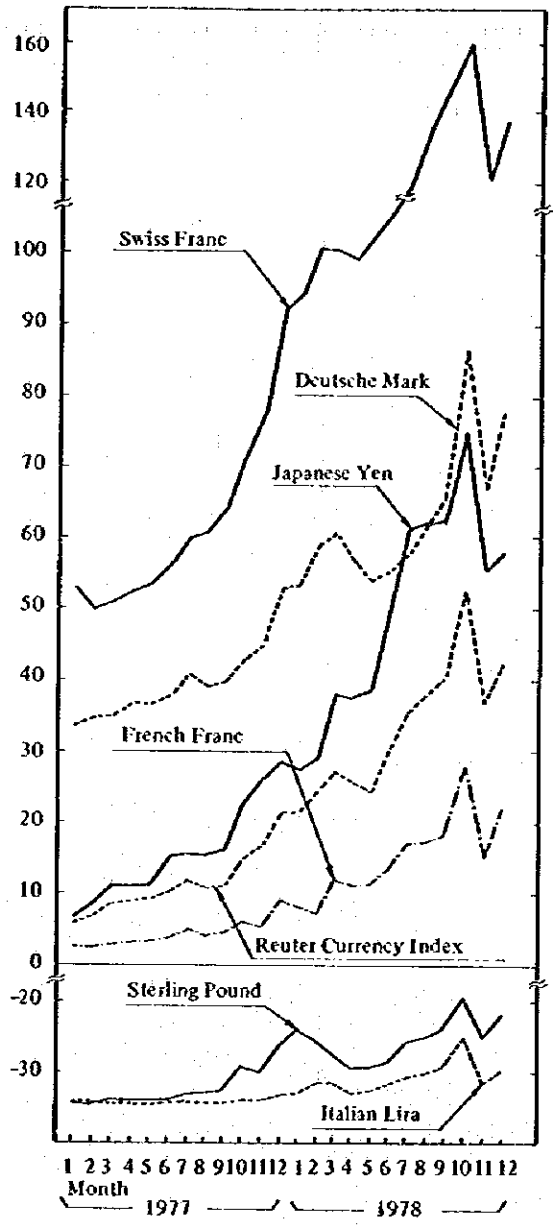


Fig. 2-1 Effective Exchange Rates against U.S. Dollar in Major Currencies

took important actions in succession to bolster its own currency. Several factors may be cited which prompted countries to cooperate closely with each other. For one thing, the policies which each country was required to undertake as part of concerted actions were now more practical and of a longer range conforming to the prevailing circumstances, unlike those aimed at short-range effect which used to be pressed upon specified countries, a typical example of which was the so-called "locomotive argument". Besides, most countries except the United States, helped by better economic performances, had much more leeway to carry out new policies in concert with other countries. Another factor was that not only European countries, closely linked to each other by thick economic bonds, but the United States, where exports and imports claim an increasing share of its GNP, began to realize more clearly how the trade and economic performance of one country could affect those of other countries and how seriously the domestic economy could be hit by external imbalances.

Policies followed by the United States turned from cautious at the beginning of 1978 to highly restrictive after the middle of that year. European countries while pursuing basically restraint policies, mixed them with reflationary ones as occasion demanded. But common to them was the precedence they gave to prevention of resuring inflation.

2.5 Developing Countries and Nonmarket Economies

(Developing Countries)

The economies of developing countries generally fared well, supported domestically by the improved agricultural output and increased development spending. Externally, however, they faced serious problems. Particularly, non-oil producing countries, which depend on agriculture, suffered accumulated external debts as they had to rely on borrowed funds to finance their agricultural and industrial development projects. Their chronic current account deficits, instead of diminishing, increased further in 1978 as the prices of their primary products remained depressed while the import prices of manufactures went up.

Oil producing countries also saw their surpluses cut drstically and the growth of their economy slow down because of their decreased oil exports, the steep fall in the value of the dollar and resurging inflation. However, in some of the countries which have enormous revenues from oil sales, good effects on their economy began to emerge from their ambitious development plans, though their implementation was being hampered by the poor infrastructure, the shortage of work force and inflation. Notable among such development plans were Saudi Arabia's fifth five-year plan (1973~78, total investment: $142,000 million), Iran's fifth five-year plan (1973~78, total investment: $69,600 million), and Iraq's national development plan (1976~80, total investment: $45,000 million). (The Iranian economy suffered a setback because of its political unrest.) Kuwait aimed to become a financial state investing its oil revenues in developed countries. It consolidated its position as a major financial center in the Middle East.

Spectacular progress has been made in recent years by many of the group known as newly industrializing countries (NICS). Prominent among them are South Korea, Hong Kong, Taiwan and Singapore, where both industrial production and exports have been growing by almost 20% annually, with the real growth of GNP running at 10~20% in 1978. Growth on that score has continued into this year. One of factors behind their successful industrialization and economic development has been that they have increased the export of their industrial manufactures intensively to the markets in developed countries.

(Nonmarket Economies)

In 1978, the Soviet economy grew beyond its target due mainly to the favorable grain output. But the Soviet agricultural production in 1978 was not so big as to yield surpluses to be exported, as its massive grain imports from the United States in 1979 indicated. One of the features of the Soviet economy is that its performance is influenced greatly by agricultural output. While the Chinese economy did fairly well in 1978, the growth in East European countries generally slowed down because of the sluggish industrial and agricultural production.

According to the official Soviet news agency Tass, Poland registered negative growth in agriculture and the growth of its per capita real income fell to a postwar low of 1% in 1978 as against its

target growth rates of 3~4.2% for industrial production and 5.8% for agricultural production. East Germany reportedly managed to attain its 1978 goals: 5.5% growth in industrial production, 4.6% improvement in labor productivity, and 4.3% increase in national income.

Romania aimed at a two-digit growth rate in 1978 but the actual growth was below that target. Bulgaria reported a 7% growth rate in 1978. But Czechoslovakia and Hungary revised their targeted national income growth rates downward to 3%, indicating that the actual performance barely reached that level in 1978.

CHAPTER 3 DEMAND AND SUPPLY OF SHIP TONNAGE AND MARKETS

3.1 General

Seaborne trade of oil and oil products in 1978 showed a decrease of 0.2% from the preceding year. The decrease was seen because the world economy lacked buoyancy and also because the rise in the crude oil prices urged efficient use of energy and a cutback on its consumption. Tanker tonnage doubled during the past 10 years, but the high-rate growth was finally coming to a halt. The growth of tanker tonnage in 1978 over the previous year was only 3%. This was because new tanker completion totalled only 9.2 million dwt while scrappings and losses totaled 13.3 million dwt. However, dissolution of the excessive tanker tonnage is still a remote possibility. Now that there is no likelihood that the economy will grow at such a high elasticity against the GNP as in the past. Moreover, the upward pace of oil prices will quicken further. In this chapter, we will examine new supply sources of oil, discuss the problem of alternative energy and attempt a forecast of the time when the tanker market will recover the supply-demand balance.

Regarding the dry bulk division, we will make the following analysis with emphasis on supply-demand relations for cargo and ship tonnage: Seaborne trade of dry bulk cargo grew at an average annual rate of 4.2% from 1970 to 1976 but showed a drop in 1977 because the economies of major industrial democracies became stagnant after the first oil crisis and their recovery was slow. Only a fractional increase was seen in 1978 in dry bulk cargo moves. Excessive supply of ship-bottoms began to show a downward trend at last but the dry bulk fleet at present amounts to 135 million dwt, of which 20 million dwt or about 15% is an excess. Part of this is being absorbed by slow steaming or port congestion but 8 million dwt still remains laid up.

In such a situation, the dry cargo tramp market lingered very depressed for several months from the beginning of 1978. After that, freightage showed signs of rising because American grain moved to the USSR and China and because coal shipments for Europe increased. In addition, the tanker market took an upturn in autumn. As a result, increased entries of combination carriers into the tanker market followed. The dry bulk carrier market staged two minirallies in 1978 – in summer and at the year-end – and showed some promise. But it is generally believed that the supply-demand balance on the dry bulk carrier market will not recover equilibrium until the middle of the 1980s. Optimism is not a majority opinion.

3.2 Demand and Supply of Tanker Tonnage

3.2.1 Petroleum Consumption and Production

(Consumption)

The world petroleum consumption declined for two successive years in 1974 and 1975 in the wake of the oil crisis late in 1973, but rebounded to the pre-oil crisis level in 1976 and has since been rising at a slow pace.

As for consumption by major countries, the United States, which rallied from the aftermath of the oil crisis relatively fast, registered a rise of 7.4% in 1976 over the previous year and went on

to score smooth gains of 5.3% in 1977 and 2.5% in 1978. By contrast, the West European nations posted a fall of 1.8% in 1977 after showing a gain of 6.9% in 1976, and scored a 2.5% rise in 1978. The volume of consumption in that region in 1978, totaling 715 million tons, still fell short of the 749 million tons in 1973. Meanwhile, Japan's consumption also continued rather slack because of restraint on investment and the spread of an energy-saving mood, increasing by only 3.9% in 1976, 2.7% in 1977 and 0.8% in 1978. Consumption in the Free World as a whole displayed a parallel trend, and in 1978, rose by 3% over the previous year to 2,478 million tons. However, petroleum consumption in the nonmarket economy bloc showed no major fall. As a result, the growth rate of world consumption stood at 6.7% in 1976, 2.9% in 1977 and 3.3% in 1978.

(Production)

Next, as for petroleum production, not a few oil-producing countries registered downtrends in 1974 and 1975 as the world oil consumption slackened under the impact of economic recession after 1974. Production drops of the United States and Venezuela were attributable to their limited petroleum deposits. The United States, however, posted a gain of 4.5% in 1978 over the preceding year as oil production in Alaska began to contribute materially to that country's output. Meanwhile, the start of full-fledged production in the North Sea oilfields markedly boosted the oil output of Britain and Norway. But the oil production of the West European nations as a whole still stood at only about 90 million tons, or 3% of the world total. Meanwhile, the oil output of African nations excluding Algeria fell off, while Saudi Arabian output dropped over 10% in 1978 from the previous year. Iran also posted a fall of 8.2% partly because of political upheaval, which broke out late in the year. By contrast, Mexican oil output has been swelling with great rapidity in recent years, reaching 66 million tons in 1978, or up 23% over the previous year. Therefore, the future of Mexico's brisk production is attracting keen attention.

Oil production trends from 1973 may be classified into the following three categories:

a. Areas showing a gradual uptrend – Mexico, Iraq, Norway, Britain, the Soviet Union, China, Algeria, etc.

b. Areas showing a gradual downtrend – Canada, Venzuela, etc.

c. Areas showing a leveling-off tendency – Indonesia, the U.S., etc.

d. Areas showing fluctuations – Kuwait, Saudi Arabia, Abu Dhabi, Libya, Nigeria, etc.

The above classification shows that after the oil crisis, an upward trend was registered by such intraregional countries as Norway and Britain and oil-producing countries close the consuming centers like Mexico, China, Algeria, and Iraq. A downtrend was displayed by self-sufficient Canada and the "close-to-consuming-center" Venezuela. As for Indonesia, which recorded a leveling-off trend, estimated oil reserves are relatively small as is the case of Venzuela, apparently leaving little room for increased production. The estimated oil reserves of the United States are even smaller. In 1978, its oil output increased thanks to stepped-up oil production in Alaska. However, owing to the limited pipeline capacity in Alaska, oil output in the region cannot be boosted to the extent of more than compensating for a drop in the mainland United States.

Table 3-1 World Oil Consumption

(Unit: Million ton)

Year	'73	'74	'75	'76	'77	'78
U S A	(5.4) 818.0	(△4.3) 782.6	(△2.1) 765.9	(7.4) 822.4	(5.3) 865.9	(2.5) 887.9
Canada	(5.6) 83.7	(1.3) 84.8	(△2.0) 83.1	(3.4) 85.9	(△0.4) 85.6	(1.5) 86.9
Total N. America	(5.5) 901.7	(△3.8) 867.4	(△2.1) 849.0	(7.0) 908.3	(4.8) 951.5	(2.5) 974.8
Latin America	(8.1) 163.7	(4.6) 171.3	(1.6) 174.0	(7.2) 186.5	(3.0) 192.1	(5.2) 202.0
Total W. Hemisphere	(5.8) 1065.4	(△2.5) 1038.7	(△1.5) 1023.0	(7.0) 1094.8	(4.5) 1143.6	(2.9) 1176.8
France	(11.6) 127.3	(△5.0) 121.0	(△8.8) 110.4	(8.2) 119.5	(△4.1) 114.6	(3.8) 119.0
Italy	(5.5) 103.6	(△2.7) 100.8	(△6.3) 94.5	(4.6) 98.8	(△2.7) 96.1	(3.5) 99.5
U.K.	(2.4) 113.2	(△7.0) 105.3	(△12.6) 92.0	(△0.7) 91.4	(0.7) 92.0	(2.2) 94.0
W. Germany	(6.3) 149.7	(△10.3) 134.3	(△4.0) 128.9	(7.8) 138.9	(△1.3) 137.1	(4.1) 142.7
Total W. Europe	(6.7) 748.9	(△6.6) 699.3	(△5.0) 664.4	(6.9) 710.3	(△1.8) 697.3	(2.5) 714.6
Middle East	(9.3) 62.2	(7.9) 67.1	(△0.5) 66.8	(11.8) 74.7	(5.6) 78.9	(5.6) 83.3
Africa	(9.6) 49.0	(2.7) 50.3	(2.0) 51.3	(7.6) 55.2	(3.6) 57.2	(5.4) 60.3
South Asia	(8.3) 31.3	(△5.4) 29.6	(1.7) 30.1	(8.3) 32.6	(5.8) 34.5	(7.5) 37.1
S. E. Asia	(9.0) 77.6	(2.1) 79.2	(2.5) 81.2	(9.2) 88.7	(8.0) 95.8	(10.2) 105.6
Japan	(14.8) 269.1	(△3.8) 258.9	(△5.8) 244.0	(3.9) 253.5	(2.7) 260.4	(0.8) 262.6
Australasia	(9.8) 34.8	(2.9) 35.8	(△2.0) 35.1	(4.0) 36.5	(4.1) 38.0	(△0.8) 37.7
U S S R	(7.3) 317.7	(7.5) 341.5	(6.0) 362.0	(5.0) 380.0	(4.0) 395.0	(4.5) 412.8
E. Europe	(14.5) 76.7	(5.6) 81.0	(6.2) 86.0	(4.7) 90.0	(5.6) 95.0	(5.7) 100.4
China	(24.8) 53.8	(15.1) 61.9	(10.3) 68.3	(12.6) 76.9	(6.6) 82.0	(3.3) 84.7
Total E. Hemisphere	(9.2) 1721.1	(△1.0) 1704.6	(△0.9) 1689.2	(6.5) 1798.4	(2.0) 1834.1	(3.5) 1899.1
World (excl. U S S R) E. Europe & China	(7.5) 2338.3	(△3.4) 2258.9	(△2.8) 2195.9	(6.9) 2346.3	(2.5) 2405.7	(3.0) 2478.0
World	(7.9) 2786.5	(△1.6) 2743.3	(△1.1) 2712.2	(6.7) 2893.2	(2.9) 2977.7	(3.2) 3075.9

Note: Figures in parenthesis are percentage changes
Source: BP Statistical Review

Table 3-2 World Oil Production

(Unit: Million ton)

Year	'73	'74	'75	'76	'77	'78
U S A	(△2.5) 519.0	(△4.3) 496.7	(△4.6) 473.9	(△2.5) 462.0	(1.0) 466.8	(4.5) 487.8
Canada	(15.2) 102.3	(△5.7) 96.5	(△13.5) 83.5	(△7.5) 77.2	(△1.9) 75.7	(△1.7) 74.4
Total N. America	(0.1) 621.3	(△4.5) 593.2	(△6.0) 557.4	(△3.3) 539.2	(0.6) 542.5	(3.6) 562.2
Mexico	(8.5) 26.9	(17.5) 31.6	(24.4) 39.3	(10.9) 43.6	(23.2) 53.7	(22.9) 66.0
Venezuela	(4.4) 179.0	(△11.5) 158.5	(△21.0) 125.3	(△1.9) 122.9	(△2.8) 119.5	(△3.4) 115.4
Total L. America	(6.5) 272.1	(△6.4) 254.7	(△10.6) 227.6	(0.8) 229.5	(4.0) 238.6	(5.4) 251.5
Total W. Hemisphere	(1.9) 893.4	(△5.1) 847.9	(△7.4) 785.0	(△2.1) 768.7	(1.6) 781.1	(4.2) 813.7
Norway	(12.5) 1.8	(△5.6) 1.7	(447.1) 9.3	(48.4) 13.8	(△2.2) 13.5	(27.4) 17.2
U. K	(−) 0.1	(−) 0.1	(1100.0) 1.2	(858.3) 11.5	(229.6) 37.9	(40.9) 53.4
Total W. Europe	(1.4) 22.6	(−) 22.6	(35.4) 30.6	(47.1) 45.0	(55.8 70.1	(28.0) 89.7
Abu Dhabi	(23.7) 62.6	(8.2) 67.7	(△0.6) 67.3	(14.1) 76.8	(4.2) 80.0	(△12.9) 69.7
Iran	(16.4) 293.2	(2.7) 301.2	(△11.1) 267.7	(10.2) 295.0	(△3.9) 293.5	(△8.2) 260.4
Iraq	(37.3) 99.0	(△2.3) 96.7	(14.8) 111.0	(7.0) 118.8	(3.0) 122.3	(△8.2) 127.6
Kuwait	(△8.5) 138.4	(△17.3) 114.4	(△19.2) 92.4	(6.5) 98.4	(△8.9) 89.6	(4.7) 93.8
Saudi Arabia	(27.8) 364.7	(13.1) 412.4	(△16.6) 343.9	(22.6) 421.6	(7.9) 455.0	(△10.3) 408.2
Total Middle East	(17.0) 1047.3	(3.4) 1083.1	(△10.1) 973.5	(13.7) 1107.3	(0.8) 116.5	(65.6) 1054.1
Algeria	(2.8) 51.2	(△8.1) 47.1	(0.9) 47.5	(5.5) 50.1	(6.8) 53.5	(6.9) 57.2
Libya	(△3.1) 104.9	(△30.1) 73.3	(△2.7) 71.3	(30.9) 93.3	(6.5) 99.4	(△4.2) 95.2
Nigeria	(12.6) 100.1	(12.1) 112.2	(△20.9) 88.8	(15.9) 102.9	(1.2) 104.1	(28.7) 95.1
Total Africa	(2.8) 290.0	(△7.1) 269.4	(△7.8) 248.5	(15.0) 285.8	(6.8) 305.2	(△2.7) 297.1
Indonesia	(23.6) 66.0	(2.9) 67.9	(△4.9) 64.6	(15.5) 74.6	(11.9) 83.5	(△3.0) 81.0
Total S.E. Asia	(24.8) 82.0	(△0.1) 81.9	(△4.2) 78.5	(17.8) 92.5	(12.2) 103.8	(△0.4) 103.4
U S S R	(6.9) 421.0	(7.4) 452.0	(7.3) 485.0	(6.2) 515.0	(4.9) 540.0	(5.9) 572.0
China	(30.2) 54.8	(20.4) 65.8	(12.9) 74.3	(12.5) 83.6	(7.7) 90.0	(6.7) 96.0
Total E. Hemisphere	(12.5) 1965.1	(2.9) 2022.5	(△4.1) 1940.5	(12.4) 2180.3	(4.7) 2281.8	(△0.5) 2270.3
World (excl. China) USSR E. Europe	(9.0 2363.5	(△1.3) 2332.9	(△8.0) 2146.2	(8.6) 2330.4	(3.5) 2412.9	(△0.7) 2395.0
World	(9.0) 2858.5	(0.4) 2870.4	(△5.1) 2725.5	(8.2) 2949.0	(3.9) 3062.9	(0.7) 3084.0

Note: 1. Figures in USA contains LNG
2. Figures in parenthesis are percentage changes

Source: BP Statistical Review

(Recent Problems of Production)

Iran's oil production tapered off from around October 1978 as a result of political confusion, and sagged to a low level until February 1979 due mainly to workers' strike. On Feb. 17, however, the general strike was called off, followed by the resumption of oil exports on March 5. Iran's oil output reportedly recovered to four million b/d in mid-April.

In the past, an international consortium used to produce most of Iran's crude oil output. However, production has now been taken over by National Iranian Oil Company (NIOC) under a policy of direct sales to foreign countries.

Among the oil majors, high ratios of dependence on Iranian oil are shown by British Petroleum (BP) (39%), Gulf Oil (19%), Royal Dutch Shell (14%) and CFP (12.5%) (all as of 1977). Other majors are less dependent on Iranian oil – Exxon (8.9%), Texaco (4.9%), Chevron (4.7%) and Mobil Oil (9.7%).

(Oil Consumption Trend as against GDP)

The growth pace of world petroleum consumption continued faster than that of its economy in terms of GDP (gross domestic product) in the 1950s – the period of postwar reconstruction – and the 1960s when major industrial countries entered the "high growth" period. Moreover the first half of the 1960s witnessed a shift from solid to liquid fuel as coal was replaced as principal energy source by petroleum. As a result, petroleum consumption kept on expanding smoothly until 1973.

In the wake of the oil crisis, which broke out late in 1973, the world petroleum consumption as against economic activity described a downward curve because of stagnant economic growth as typified by the minus growth of the American economy from 1973 to 1975 and the slowdown of economic growth in Western Europe from 1974 to 1975 and in Japan from 1973 to 1974, as well as consumption restraint prompted by soaring oil prices. This downtrend is expected to be accelerated by the stepped-up development of alternative energy sources. To analyse the past trends as shown in the table 3-3, Canada showed a gradual downtrend after hitting a peak in 1970. The United States, after the peak years of 1972 and 1973, registered successive drops in 1974 and 1975, but then a gradual uptrend in 1976 and 1977. Japan hit a peak in 1973 after a fall in 1972, but then posted a steep downtrend until 1975, followed by a gradual decrease in 1976 and 1977.

Western Europe posted a sharp drop in 1974 after a peak in 1973, followed by a further drop in 1975. Then came a slight increase in 1976, but a drop was registered again in 1977.

Compared with these nations, Australia and New Zealand showed moderate trends by and large – a gradual downtrend after a peak in 1973 and 1974, and a leveling-off tendency in 1977.

Developing nations displayed a gradual downtrend from 1971 to 1975 and a rise in 1976, but a slight fall again in 1977.

Table 3-3 Oil Consumption per Real GDP

(Unit: kg/$)

Region \ Year	1967	'68	'69	'70	'71	'72	'73	'74	'75	'76	'77	'78
U S A	0.4684	0.4782	0.4899	0.5103	0.5136	0.5238	0.5238	0.5073	0.5017	0.5106	0.5140	0.504
Canada	0.5472	0.5552	0.5517	0.5679	0.5513	0.5449	0.5349	0.5234	0.5066	0.4950	0.4950	0.485
E. Europe	0.3557	0.3733	0.3930	0.4142	0.4186	0.4291	0.4331	0.3957	0.3804	0.3887	0.3731	0.368
Japan	0.4468	0.4548	0.4802	0.5069	0.5316	0.5188	0.5416	0.5228	0.4861	0.4748	0.4630	0.445
Australasia	0.3867	0.3501	0.3557	0.3642	0.3622	0.3577	0.3661	0.3663	0.3535	0.3420	0.3449	0.355
Developing Countries				0.3992	0.4031	0.3996	0.3990	0.3852	0.3768	0.3846	0.3828	0.380

Source: OECD National Accounts, BP Statistical Review

3.2.2 Current Energy Problem

Oil production in Iran, which in the past used to export five million to six million b/d, was greatly affected in 1978 by political unrest and, showing a sharp fall in the fourth quarter primarily because of workers' strikes. As a result, Iran's oil exports dropped to a half, forcing a reduction of over 100 million tons in the world's oil supplies. As a consequence, the oil supply situation became tight from late 1978, causing the bench mark crude price to soar to $18 a barrel. Saudi Arabia and other major oil-producing countries are so-called "low absorber" nations with a small population. This, coupled with the oil strategy of the Organization of Petroleum Exporting Countries (OPEC), makes it unlikely that oil supplies would be increased to meet the growth of consumption. Moreover, against the background of the rising proportion of direct sales (so-called "direct deal" sales) in oil-producing nations' crude exports, consuming nations became increasingly dependent on spot oil. As a result, spot market prices surged up sharply.

Oil-consuming countries, in an effort to cope with the oil supply shortage, have come up with a series of measures to curb consumption as instanced by communiques issued by the Tokyo Summit of industrialized countries and the International Energy Agency (IEA). The IEA, anticipating a crisis in the mid-1980s, has called upon the member nations to hold down their average energy elasticity – the ratio of energy consumption growth to real economic growth – to not more than 0.8 through maximum efforts to improve energy consumption efficiency, to whittle down their petroleum consumption by 5%, to expand the use of coal, and to promote the development of natural gas and atomic power generation.

The Tokyo Summit, meanwhile, specified nation-by-nation target figures for oil import restriction on the ground that the most urgent task is to reduce petroleum consumption and speed up the development of other energy sources.

However, how are the prospects of coal and atomic power, which are counted on to make up for the fall in imported petroleum? As for coal, which still exists underground in vast quantities, gasification techniques have been under study for years, but it will still be some time before they can be put to practical use. The development of techniques for production high-grade methanol from coal has been started vigorously recently. As regards atomic power, for which the lead time is shortest, the reliability of atomic power stations still leaves something to be desired, and improvement is called for with respect to their management and operation. Development of other

Table 3-4 Restrictive Goal of Oil Import in Major Industrial Countires

(Unit: Barrels/day)

	'78	'79	'80	'85
Japan	523	540	540	630–690
U.S.A.	828	850	850	850
Canada	23	15	15	60
U. K.	83	--	--	83
W. Germany	281	--	--	280
France	223	--	--	220
Italy	189	--	--	190
E C	--	1,000	940	940

Source: The ASAHI, June 30, 1979

new sources of energy, such as solar heat, hydrogen energy, wind power, tidal power, geothermal energy and use of temperature difference in sea water, are still in the experimental stages, and their practical application will need many more years. As to oil shale and tar sand, it seems difficult to boost production of oil from these materials in a short time.

3.2.3 Seaborne Oil Movements

Crude oil and petroleum products hauled across oceans in 1978 amounted to 1,441.5 million tons, showing a drop of 0.2% from the previous year in contrast with gains of 12.4% in 1976 and 3.6% in 1977, according to statistics compiled by Fearnley & Egers. This amount accounted for about 64% of the world trade in bulk cargoes as against 66% in 1977. On a ton-mile basis, the ratio of petroleum to the bulk trade stood at 73.2% in 1977 and 70.2% in 1978, indicating the long transport distance of oil cargo.

According to BP's statistics, ocean oil cargo movements in 1978 totaled 1,695 million tons, down 2.8% from the preceding year. Of the total, 386 million tons (23.4%) went to the United States, 260 million tons (19.5%) to Japan, and 686 million tons (39.2%) to Western Europe. These three regions combined accounted for 78.5% of the total oil movements across oceans. In their respective oil imports, however, crude oil carried over the long distance from the Middle East diminished – that is, down 11.5 million tons for the United States, down 6.7 million tons for Western Europe and down 5.5 million tons for Japan. Ocean oil movements to the United States in 1978 decreased by 18.1 million tons to 386.3 million tons. That nation's oil imports from the Middle East and West Africa fell by 23.6 million tons (down 12.1 million tons in West African oil). It is notable, however, that to make up for the loss, the United States bought 15 million tons from Mexico (80% of Mexico's total oil exports) and 13.7 million tons from the North Sea oilfields.

Western Europe's oil imports in 1978 rose by 9 million tons to 648.2 million tons. As was the case with the United States, the region's oil purchases from the Middle East and West Africa went down, but imports from Latin America increased, while the output of the North Sea oilfields increased by 33% to 62.6 million tons, enabling Western Europe to lower its dependence on traditional supply sources.

Table 3-5 Inter-Regional Oil Movements

Unit: Million M/T, %

	U S A			Western Europe			Japan			World			Increase Contribution of Export		
	'76	'77	'78	'76	'77	'78	'76	'77	'78	'76	'77	'78	'76	'77	'78
Latin America	105.0	113.8	114.3	17.5	15.1	18.3	0.5	0.5	0.8	172.9	162.3	177.2	6.6	△53.8	36.0
Western Europe	7.8	12.4	18.5	– –	–	–	–	–	–	16.9	23.7	27.2	2.2	34.5	8.5
Middle East	94.6	125.1	113.6	466.5	436.0	429.3	196.2	203.6	198.1	1033.2	1024.4	974.9	55.4	△44.7	△119.6
North Africa	43.8	62.9	62.6	80.3	82.4	84.5	2.2	1.2	0.5	147.2	157.1	161.0	23.7	50.3	9.4
West Africa	54.3	60.7	48.6	42.9	42.2	38.9	1.3	–	–	111.5	118.0	105.5	6.5	33.0	△30.2
S. E. Asia	28.0	28.3	27.4	0.2	1.0	1.0	51.5	54.2	52.1	84.2	91.9	85.9	5.7	39.1	△14.5
USSR, E. Europe & China	1.0	0.7	0.5	69.6	76.4	71.3	6.9	7.3	7.7	93.0	101.0	102.7	9.3	40.6	4.1
Total Imports	335.0	404.4	386.3	681.8	657.2	648.2	262.4	270.6	262.6	1675.1	1694.8	1653.4			
Increase Contribution of Import	35.7	351.8	△43.7	26.8	△104.9	△21.7	8.2	41.6	△19.3	(14.2)	(1.2)	(△2.4)			

Note: Figures in parentheses are percentage changes
Source: BP Statistical Review

Japan's oil imports in the year under review showed a drop of 8 million tons to 262.6 million tons. Purchases from the Middle East declined by 5.5 million tons and those from Southeast Asia by 2.1 million tons.

Among major oil-exporting regions, shipments from the Middle East, West Africa and Southeast Asia decreased, while shipments from North Africa scored a slight increase and those from Latin America also expanded. Besides, shipments from Western Europe posted an increase.

Another notable trend was brisk shipments within Latin America, which increased by 12.9 million tons over 1977, according to the BP statistics.

3.2.4 Supply of Tanker Tonnage

1) Trend of Tanker Fleet

According to Lloyd's Register, the world's oil tanker fleet totaled 175 million g/t in mid-1978, showing an increase of only 3% (910,000 g/t) over the year before. This is worthy of note as an indication that the rapid growth of the world tanker fleet over the past decade finally came to an end. The tanker tonnage had doubled in the 10 years. In consequence, the proportion of tankers in the world mercantile marine dropped for the first time (from 44% to 43%). This trend is likely to persist for the time being in the light of the current backlog of orders for tankers and the progress of tanker scrapping.

Table 3-6 The Growth of the World Oil Tanker and Dry Bulk Carrier Fleets
1974 – 1979

Unit: In thousand d.w.t.

Tankers	January 1974	January 1975	January 1976	January 1977	January 1978	January 1979
10–30,000 dwt	27,103	26,064	24,092	21,700	18,658	17,210
30–175,000 dwt	94,840	101,914	111,995	116,183	117,839	112,336
Over 175,000 dwt	88,832	116,432	148,555	174,518	192,877	196,369
Total	210,775	244,410	284,642	312,401	329,374	325,915
Combination Carriers						
Ore/oil carriers	20,344	22,752	23,862	25,321	26,335	26,072
Ore/bulk/oil carriers	15,024	17,861	19,437	21,237	21,758	22,447
Total	35,368	40,614	43,299	46,558	48,093	48,519

Source: 'Shipping Statistics Economics' H.P. Drewry (Shipping Consultants) Ltd.

As shown in the Table 3-9, oil tankers of 10,000 dw/t or more declined by 1.1% from 329.4 million dw/t to 325.9 million dw/t during 1978. This is because tankers scrapped or lost in marine accidents amounted to an estimated 13.3 million dw/t, whereas only 9.2 million dw/t of new

bottoms were added to the world tanker fleet. According to "Review 1980" of Fearnley & Egers, the surplus tanker tonnage increased from about 75 million dw/t at the start of the year to 100 million dw/t in July, but again decreased to about 80 million dw/t as demand for tankers became somewhat lively in the fourth quarter. However, the recovery of demand was not so widespread as to involve supertankers partly on account of Iran's political turmoil. Therefore, the laid-up tanker fleet showed no appreciable decline.

Meanwhile, combination carriers posted a slight increase from 26.1 million g/t (46.8 million dw/t) in mid-1977 to 26.4 million g/t (47.4 million dw/t) in mid-1978. Most of them are relatively new with those less than 15 years old accounting for as much as 96%. This naturally spells a low level of scrapping, and during 1978, the scrapped total came to only 900,000 dw/t. By contrast, newly commissioned combination carriers aggregated 13 million dw/t with an additional 2.2 million dw/t on order. The supply-demand situation of combination carriers was no less unstable than that of tankers with the ratio of idle bottoms standing at 15% as against 12% for tankers.

Of the total cargo volume hauled by combination carriers in 1978, oil accounted for 55%, and dry bulk cargo 45%, showing much the same ratios as in the previous year. Freight rates for oil reached the profitable level for the first time in several years thanks to a pickup in oil transport demand in the fourth quarter. In stark contrast, combination carriers took a beating in a race with bulk carriers in the dry cargo market as ocean movements of iron ore and coking coal were inactive owing to slack demand for steel. This was also attributable to the relatively large size of combination carriers. That is, vessels of less than 70,000 dw/t accounted for 80% of bulk carriers, while more than 94% of combination carriers operating in the dry cargo market were large vessls of over 70,000 dw/t.

As for small-sized tankers of 60,000 dw/t or less, scrapping of over-age and uneconomical bottoms made smooth headway because of improvement in the tanker market late in 1978, bringing about a near supply-demand equilibrium in this sector.

3.2.5 Tanker Orders and Future Tanker Fleet

Orders for oil tankers amounted to more than 100 million dw/t in 1973, but plunged in the wake of the oil crisis, running at 2.7 million to 2.8 million dw/t in recent years. Meanwhile, orders for combination carriers also showed a similar downtrend, standing at 400,000 dw/t in 1977 and 500,000 dw/t in 1978.

This, coupled with successive cancellations of orders, caused the world's backlog of orders to shrink quickly from year to year. The backlog of orders, including those for combination carriers, which still stood at nearly 84 million dw/t at the end of 1975, plummeted to less than 20 million dw/t in 1977 and further to 11.45 million dw/t in 1978.

The following table shows tankers and combination carriers on order as classified by time of delivery. It may be judged from the table that the pressure of oversupply will gradually lessen unless a mood for ordering new vessels mounts substantially among shipowners.

Table 3-7 Tanker Fleet Statistics

	Oil Tanker	Combination Carrier		Oil Tanker	Combination Carrier
World Tanker Fleet (in Million dwt)			Tonnage Broken up and lost (in '000 dwt)		
1975	290.9	44.2	1975	9200	–
1976	320.5	46.8	1976	11000	–
1977	331.9	48.3	1977	9100	–
1978	327.4	48.7	1978	13300	–
Deliveries of New Building (in '000 dwt)			New Contract 1975 – 78 (in '000 dwt)		
1975	45376	2604	1975	2700	1800
1976	40522	2783	1976	2100	1600
1977	19618	2155	1977	2800	400
1978	9213	1312	1978	2700	500
Tonnage laid up (in Million dwt)			Total Order Book (in '000 dwt)		
at the end of 1975	41.3	–	at the end of 1975	77327	6493
1976	31.0	–	1976	31393	4488
1977	29.3	6.3	1977	15995	3075
1978	24.0	3.5	1978	9337	2115

Combined Carrier Shipments

	Oil		Dry	
1975	112.4	51%	106.4	49%
1976	120.8	50%	122.8	50%
1977	152.1	57%	116.5	43%
1978 (Est.)	142.0	55%	116.0	45%

Source: Fearnley & Egers Chartering Co., "Review 1978"

Table 3-8 World Order Book, Year of Delivery, as of end 1978

(in Million dwt)

	Oil Tanker	Combination Carrier	Total
1979	5.6	1.4	7.0
1980	1.8	0.5	2.3
1981	1.9	0.2	2.1
Total	9.3	2.1	11.4

Source: Fearnley & Egers Chartering Co., "Review 1978"

Table 3-9 Estimated Tanker Fleet

(in Million dwt)

	Oil Tanker	Combination Carrier	Total
at the end of			
1978	327.4	48.7	376.1
1979	322.0 (△1.6)	49.1 (0.8)	371.1 (△1.3)
1980	315.3 (△2.1)	48.4 (△1.4)	363.7 (△2.0)
1981	311.2 (△1.3)	47.6 (△1.7)	358.8

Note: Figures in Blacket shows the rate of increase and decrease compared with previous year.

Source: Fearnley & Egers Chartering Co., "Review 1978".

Supposing the tanker supply and demand were balanced in 1973 when the highest tanker rates before the oil crisis were registered, the supply-demand indexes in the subsequent years work out as follows in therms of 100 for both the tanker fleet and ocean oil movements in 1973.

Table 3-10 Fleet Supply and Demand Index

	Tanker Fleet Index	Oil Seaborne Transport Index (Ton Mile)	Difference
1973	100	100	–
75	134.5	95.2	39.3
76	150.1	109.4	40.7
77	160.0	112.2	47.8
78	161.8	109.0	52.8

The above table shows the supply-demand gap has been widening annually since 1975, attesting to an absolute excess of tanker tonnage. It thus indicates no downtrend of surplus tanker tonnage, although consideration must be give to a change in the ratio of tankers in active service resulting from a change in operational efficiency due to such measures as cargo partly loaded and slow steaming to cope with sluggish cargo movements. This was ascribable to a total slowdown in the growth of ocean oil movements in terms of ton-mile. As already noted, however, deliveries of new tankers began to show a substantial decrease in 1978, while tanker scrappings are running at a high level. It may be said, therefore, that the pressure of oversupply in the tanker market has finally started to weaken.

3.2.6 Tanker Market in 1978

Petroleum carried by sea in 1978 totaled 1,653.4 million tons, down 41.4 million tons or 2.4% from the previous year's 1,694.8 million tons. On a ton-mile basis, a drop of 7.4% was registered from 10,464 billion ton-miles in 1977 to an estimated 9,693 billion ton-miles in 1978.

The world tanker fleet, meanwhile, amounted to 320.24 million dw/t as of the end of 1978, down 9.45 million dw/t or 3.0% from 329.69 million dw/t at the end of the previous year according to J.I. Jacob. If half of the combination carrier tonnage is added to the tanker fleet, the total dwindled by 2.6% from 353.23 million dw/t at the end of 1977 to 344.18 million dw/t at the end of 1978.

As a result, both supply and demand in the tanker market posted drops, showing a tendency toward a balance at a reduced level. As noted in the above, ocean oil movements in 1978 declined by 41.4 million tons. But the three major oil-importing areas -- the United States-Canada, Western Europe and Japan -- registered a combined decrease of 41.5 million tons. Moreover, all of them showed conspicuous drops in imports from the Middle East, a distant supply source. By contrast, substantial rises were seen in the oil production of non-OPEC supply sources not far from consuming centers, such as Mexico and the North Sea oilfields. As a result, short-distance oil movements swelled, such as within Latin America and between Western Europe and North America.

In terms of supply-demand relationship, therefore, the large-sized tanker division turned out generally bearish, whereas the small-sized tanker division was basically on the bullish side. In the first half of 1978, there were moves among the OPEC countries to replace the dollar with the SDR (special drawing right) for the pricing of petroleum in view of the depreciation of the American currency. But they failed to achieve a consensus on the matter.

Among oil-consuming countries, meanwhile, surplus oil refining capacity became evident. Especially in West European nations, the refinery operating ratio reportedly sagged to 60% or so. Under these circumstances, the EC Commission proposed curtailing the region's oil refining capacity by 75 million tons a year. J.C. Welbergen, chairman of Deutsche Shell, said it was necessary to carry out a reduction of 150 million tons a year by 1980.

Tanker rates leveled off at the rock bottom on the whole especially in the large-sized tanker division because the deceleration of national economies and bulging oil stockpiles worldwide brought about a decline in ocean oil movements and moreover, oil purchases from the Middle East were reduced. As a consequence, laid-up large-sized tankers showed an upswing.

In the first half of the year, some improvement was noted in the Caribbean/Atlantic Coast, North America trade. That is, rates for medium- and small-sized tankers picked up in that market in mid-February. A cold wave in the United States prompted replenishment of oil stocks, which in turn boosted that country's oil imports in February and March. Consequently, rates for vessels of less than 30,000 dw/t in the clean tanker division showed an upsurge.

In the latter half of the year, a rush of oil buying set in from around August in anticipation of crude oil price hike at OPEC's general meeting toward the end of the year, sending both oil import contracts and tanker rates surging up. Moreover, Japan's stockpiling of crude oil in idle tankers apparently helped to improve the tanker market. In these circumstances, oil purchase contracts hit a peak in October. In that month, VLCC rates surpassed WS 50 in the Persian Gulf/Europe trade, while ULCC rates also reached the WS 40 mark for the first time. Although oil contracts declined in November and December, tanker rates continued to spiral up until the early part of December.

From the beginning of the year, political unrest became evident in Iran, frequently touching off disturbances and strikes. In October, 30,000 Iranian workers at oil installations went on a two-week strike. The walkouts were called off temporarily, but resumed from Dec. 4, bringing about a fall in that country's oil production again.

Meanwhile, the laid-up tanker fleet in 1978 kept on swelling up to July owing to a drop in oil transport demand in the first half of the year. That is, the laid-up tonnage, which stood at 35.35 million dw/t at the outset of the year, hit a peak of 47.36 million dw/t in July, or up 12 million dw/t. Nevertheless, a rush of oil purchases in anticipation of oil markup at OPEC's general meeting plus a tighter supply-demand situation of oil resulting from Iran's production cutback caused an upturn in the tanker market, which in turn brought on a sharp fall in the laid-up tanker tonnage from August. The laid-up tanker fleet in December stood at 23.94 million dw/t, or only about half the August level of 47.36 million dw/t.

Tanker scrappings in 1978 amounted to 13.59 million dw/t, or about twice the previous year's 7.55 million dw/t.

The so-called "slow steaming" (reduction of speed) enabled 39.3 million dw/t of idle tankers to be reactivated in the year. This showed a slight drop from the previous year's 40.7 million dw/t.

Table 3-11 Crude Oil Spot Contracts and Average W.S. in Main Routes

Unit: '000 DWT, WS

Rout / Year	PG – West	WS	PG – East	WS	Carib. – USAC	WS
1973	76834	185	11781	188	22695	235
74	68379	65	10869	97	11929	135
75	39024	27	9718	61	14281	73
76	113889	33	27032	55	41615	85
77	117939	28	30225	48	51609	84
78	96792	32	34806	55	49049	105

Source: Oil & Energy Trends, Feb. '79

Table 3-12 Average W.S. Rates by Ship's Size

Unit: WS

Size / Year	150,000 DWT & above	60 – 150,000 DWT	30 – 60,000 DWT	Under 30,000 DWT (Dirty)	Under 30,000 DWT (Clean)
1974	59.6	86.1	132.5	177.1	208.8
75	21.7	42.9	70.0	101.0	106.4
76	28.8	50.9	81.8	108.8	117.0
77	24.7	47.4	85.0	121.5	127.7
78	29.1	64.1	107.9	152.2	162.4

Source: Norwegian Shipping News

3.3 Demand and Supply of Tramp Ships

3.3.1 World Seaborne Trade in Main Dry Bulk Commodities

Between 1970 and 1976, world seaborne trade of major dry bulk commodities in the world attained uninterrupted growth, showing an average annual growth rate of 4.2%. In 1977, however, economic activities were sluggish and such trade showed a decrease of 1 million tons from the previous year. In 1978, an increase over the 1976 level was seen but the increase was only 1.4%. In terms of ton-mile, the increase was also small – only 2%.

Table 3-13 World Seaborne Trade of Main Bulk Commodities 1968–1978

	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978
IN MILLION METRIC TONS											
Iron ore	188	214	247	250	247	298	329	292	294	276	278
Coal	73	83	101	94	96	104	119	127	127	132	127
Grain	78	71	89	91	108	139	130	137	146	147	169
Bauxite	26	30	34	35	35	38	42	41	42	46	46
Phosphate	32	32	33	35	38	43	48	38	37	44	47
Main dry bulk	397	430	504	505	524	622	668	635	646	645	667
IN MMM TON-MILES											
Iron ore	775	919	1093	1185	1156	1398	1578	1471	1469	1386	1384
Coal	310	385	481	434	444	467	558	624	591	610	560
Grain	407	367	475	487	548	760	695	734	779	801	945
Bauxite	70	84	99	108	109	133	158	168	158	167	162
Phosphate	119	118	116	121	143	159	168	127	125	160	168
Main dry bulk	1681	1873	2264	2335	2400	2917	3157	3121	3122	3124	3219

Source: Fearnley & Egers Chartering Co., "World Bulk Trades 1978"

Next we will examine the seaborne trade in 1978 by item.

(Iron Ore and Coal)

The world economy showed a recovery every year with the 1975 level as the bottom, but the recovery was not vigorous. World iron and steel production did not show a strong recovery either. In the United States, which led the rest of the world in economic resurgence, crude steel production showed an increase of 7%. In Europe, crude steel production increased by 3%. In Japan, which had to curb steel exports to the United States to avert a trade dispute with that country, crude steel production showed a drop of 0.3%. As a result, raw material imports decreased. But raw material imports to Europe showed a slight increase.

Table 3-14 Crude Steal Production of Main Producing Countries

Unit: '000 M/T

Country / Year	Japan	USA	EC9	USSR	Others	World Total	Increase Rate
1955	9,408	106,173	73,141	45,271	39,007	273,000	–
1968	66,893	119,262	125,434	106,532	111,079	529,200	6.8
1969	82,166	128,153	134,731	110,315	120,635	576,000	8.9
1970	93,322	119,310	138,070	115,886	131,912	598,500	3.9
1971	88,557	109,266	128,139	120,637	138,101	584,700	△2.8
1972	96,900	120,876	139,144	125,589	148,991	631,500	8.0
1973	119,322	136,805	150,073	131,481	162,319	700,000	10.8
1974	117,131	132,197	155,587	136,206	168,979	710,100	1.4
1975	102,313	105,818	125,235	141,325	172,309	647,000	△8.9
1976	107,399	116,122	134,156	144,805	174,518	677,000	4.6
1977	102,405	113,702	126,121	146,655	184,117	673,000	△0.6
1978	102,105	124,315	132,580	151,400	203,500	713,900	6.1
Share	14.3	17.4	18.6	21.2	28.5	100.0	
Growth Rate 78/77(%)	99.7	109.3	105.7	103.2	110.5	106.1	
Average Growth Rate (%) 78/73	△3.1	△ 1.9	△ 2.4	2.9	4.6	3.9	
Average Growth Rate (%) 78/68	4.3	0.4	0.6	3.6	7.0	3.0	

Source: Handbook of Steel Statistics 1979

World seaborne trade of iron ore in 1978 totaled 278 million tons, showing an increase of about 3 million tons over the previous year, but some routes showed significant difference from the previous year's trend. The typical example is the Japan-Australia route, where seaborne trade of iron ore decreased by about 15% from 65.7 million tons in 1977 to 56 million tons in 1978. Movements to Continental Europe, including exports from Scandinavia, increased. Shipments to West Germany increased from 35.4 million tons in 1977 to 41 million tons in 1978, shipments to Italy from 15.1 million tons to 16.3 million tons and shipments to Belgium from 11 million tons to 14.3 million tons, but shipment to Britain and France decreased from 15.8 million tons to 15.7 million tons and from 15.4 million tons to 14.5 million tons, respectively. Except shipments to Britain and France, which showed some decreases, shipments to Britain and France, which showed some decreases, shipments to all other European countries increased. On the export side of things, shipments from Australia decreased from 80 million tons to 77.5 million tons,

India from 19.4 million tons to 17.4 million tons, and Canada from 24.6 million tons to 19 million tons but shipments from Brazil increased from 57 million tons to 60.7 million tons, Sweden from 19 million tons to 21 million tons and Liberia from 15.5 million tons to 17.3 million tons.

Table 3-15 Iron Ore. Total Seaborne Trade 1978.

Unit: '000 metric tons

From: \ To:	UK/ Cont.	Mediter-ranean	Other Europe	USA	Japan	Others	Total		
							1978	1977	1976
Scandinavia	18883	–	5367	567	–	1182	25999	21249	24427
Other Europe	3546	1497	145	–	1084	52	6324	5628	6428
North Africa	890	247	300	–	–	100	1537	906	1676
West Africa	15402	4570	1030	2205	632	300	24139	24216	26773
S/E Africa	6337	1231	–	96	6877	421	14962	12657	5490
North America	8539	1721	523	6300	2476	199	19758	24582	28855
S. America Atl.	24804	5458	7503	10245	20815	3687	72512	67678	79617
S. America Pac.	216	–	–	1226	8716	859	11017	12046	11986
Asia	25	764	1150	–	18090	1249	21278	22117	21437
Australia	12418	1533	737	268	55958	9933	80847	82487	85960
Not spec.	12	–	–	–	–	–	12	1956	1119
Total 1978	91072	17021	16753	20907	114648	17982	278385		
Total 1977	84650	16884	14444	20318	132587	6639		275522	
Total 1976	94624	17845	15469	27336	133727	4767			293768

Notes: Import statistics are used whenever possible.
Australia also comprises New Zealand and Oceania.
Import to USA from Canada via Great Lakes are excluded.
"Others" are partly estimated.

Source: Fearnley and Egers & Co., "World Bulk Trades 1978"

Seaborne trade in coal in 1978 was a moderate 132 million tons, down 4% from the previous year despite some increase in energy coal, because demand for metallurgical coal sharply dropped as a result of the depression of the iron and steel industry particularly during the first half of the year. Major changes in the form of foreign trade was seen in the United States in the past year. As a result of a coal mine strike, coal shipments to all destinations decreased. Exports from South Africa to Europe, on the other hand, sharply increased.

On the import side, a drop in coal imports by Japan was striking – from 60.4 million tons in 1977 to 51 million tons in 1978. In no other country did coal imports show any significant decrease. France reported an increase from 16.4 million tons in 17 million tons in 1978, West Germany from 5.1 million tons to 5.4 million tons and Finland from 3.8 million tons to 4 million tons.

On the export side, most countries except the United States, which was hit by a coal mine strike, reported increases: Canada from 12 million tons to 13.7 million tons, South Africa from 11.3 million tons to 14 million tons and Australia from 34.5 million tons to 35.3 million tons. American coal exports decreased from 34 million tons to 23 million tons and Soviet coal exports also decreased from 8 million tons to 6 million tons.

Table 3-16 Coal. Total Seaborne Trade 1978.

Unit: '000 metric tons

From: / To:	East Europe	Other Europe	North America	Australia	Others	Total		
						1978	1977	1976
UK/Continent	9770	2083	5029	4636	9532	31050	32183	29002
Mediterranean	4531	2939	3749	1205	866	13290	13614	13163
Other Europe	10999	2383	2773	892	965	18012	16951	14962
South America	1425	–	3048	–	–	4473	5423	4209
Japan	998	–	20016	24262	5760	51036	60371	60554
Others	678	390	1766	4288	1543	8665	3306	4900
Total 1978	28401	7795	36381	35283	18666	126526		
Total 1977	29951	6510	46145	34461	14781		131848	
Total 1976	30729	5029	50816	31956	8260			126790

Notes: Export statistics are used whenever possible.
Export from USA to Canada are excluded.
Coal Transportation between most Continental countries as well as between East European countries is considered as overland transportation.

Source: Same as Table 3-18

Table 3-17 Grain. Total Seaborne Trade 1978

Unit: '000 metric tons

From: / To:	USA		Canada		Argentina		Australia		Others		Total		
	1977	1978	1977	1978	1977	1978	1977	1978	1977	1978	1978	1977	1976
UK/Continent	20327	19899	2477	2341	2017	1612	679	139	4936	3959	27950	30436	31613
Mediterranean	7239	8852	1723	1060	3457	3711	12	–	2843	3619	17242	15274	14670
East Europe	10130	18513	2870	4781	2900	3432	1346	911	1619	1939	29576	18865	26621
Other Europe	4099	3342	250	100	450	130	–	6	521	469	4047	5320	3600
Africa	4908	7685	1379	1003	300	133	1392	1145	769	1504	11470	8748	7699
Americas	8674	13191	1571	2417	2364	949	123	79	391	530	17166	13123	10641
Near East	2300	2367	515	320	–	98	–	–	37	79	2864	2852	2499
Indian Ocean	2412	4560	901	1010	–	223	1848	1315	448	826	7934	5609	8108
Japan	17010	18004	2321	2063	2400	2587	2516	1959	1586	2169	26782	25833	23909
Other Far East	7391	12442	3374	3504	650	713	4662	3927	718	933	21519	16795	11078
Not Specified	3213	1396	3	6	300	–	51	78	910	1231	2711	4477	5947
Total 1978		110251		18605		13588		9559		17258	169261		
Total 1977		87703		17384		14838		12629		14778		147332	
Total 1976		92089		15266		8064		11930		19036			146385

Notes: The figures comprise wheat, maize, barley, oats, rye, sorghum and soybeans.
Export statistics are used whenever possible.

Source: Same as Table 3-15

(Grain)

Grain consumption seems to be affected by changes in population rather than by economic activities, and grain imports seem to depend on the self-sufficiency rate and the condition of crops due to weather in the importing country. Grain is a daily necessity of life, and the volume of its seaborne trade is little affected by changes in freightage. When we examine the volume of grain trade by origin, we note that the United States is the main country which has a surplus grain production available for export. Seaborne trade of American grain in 1977 totalled 87.7 million tons and accounted for 59.5% of the world total of 147.3 million tons in that year. In 1978, seaborne trade of American grain rose to 110.3 million tons and represented 65.2% of the world total of 169.3 million tons. The American share increased. In terms of matrix, grain exports from Argentina and Australia in 1978 decreased from the previous year while grain exports from the United States and Canada, among others, increased.

(Bauxite and Alumina)

World production of bauxite decreased from 85 million tons in 1977 to 84 million tons in 1978. Major producers are Australia, Guinea, Jamaica and the USSR and their outputs in 1978 were 24 million tons, 12 million tons, 12 million tons and 7 million tons, respectively. World seaborne trade of bauxite and alumina in 1978 totaled 34.6 million tons, showing a decrease of 0.8 million tons from the 46.4 million tons in the preceding year. In terms of tonnage exported, as shown in Table 3-24, Australia accounted for 25.7%, Africa 26.1% and Jamaica 21.7% of the world total exports. These three areas exported 73.5% of the world total, and they are relatively stable suppliers.

On the import side, North America represented 47.6% of the world total imports of bauxite and alumina, UK/Continent represented 12.4%, other Europe 21.1% and Japan 12.1%. These are major importers.

Table 3-18 Bauxite and Alumina. Total Seaborne Trade 1978.

Unit: '000 metric tons

From: \ To:	UK/Cont.	Other Europe	North America	Japan	Others	Total		
						1978	1977	1976
Mediterranean	609	1259	35	3	79	1985	2418	2333
Africa	1694	5186	3775	–	1250	11905	11790	10123
Jamaica	541	336	8553	–	450	9880	9546	8972
Other Americas	528	869	5800	68	335	7600	7292	6348
Asia	11	230	46	1445	405	2137	2195	2006
Australia	2252	1542	3398	3989	544	11725	12659	11754
Others	16	171	100	1	44	332	488	479
Total 1978	5651	9593	21707	5506	3107	45564		
Total 1977	6208	10349	20950	6259	2622		46388	
Total 1976	5821	10315	18527	4903	2449			42015

Notes: Import statistics are used whenever possible.
"Others" and "Other Europe" are partly estimated.

Source: Same as Table 3-15

On the ton-mile basis, exports from Australia represented 46.3% of the total. This indicates that changes in exports from Australia most affects the demand for ship tonnage. Africa, the second most important exporter, accounted for 25.9% of the total ton-mileage. By importer, UK/Continent represented 24.7%, other Europe 23.5% and the United States 30.3%.

(Phosphate Rock)

World production of phosphate rock in 1978 totaled 124 million tons, up 8% over 116 million tons in the preceding year. Major producers are such North African countries as Morocco, as well as the United States. Outputs in other areas are tending higher. World seaborne trade of phosphate rock in 1978 totalled 471 million tons, up 6% over the 444 million tons in the preceding year.

In terms of tonnage, shipments from Morocco accounted for 35.9% and shipments from the United States 28.3%. These are main suppliers. Importing countries are diverse because phosphate rock is a major raw material of fertilizers. Particularly large blocks of imports go to UK/Continent (27.0%), the Mediterranean (15.1%), other Europe (19.4%) and North America (11.4%).

On the ton-mile basis, the United States and Morocco had big shares as suppliers and accounted for 45.8% and 27.4% respectively of the world's total supply. The relations between the United States and Morocco are reversed on the ton-mile basis because the distance between Morocco and Western Europe is shorter than the world's average distance of phosphate rock transport, which is 3,600 miles.

Table 3-19 Phosphate Rock. Total Seaborne Trade 1978.

Unit: '000 metric tons

From: / To:	Morocco	Other Africa	USA	Pacific Islands	Others	Total		
						1978	1977	1976
UK/Continent	4878	3006	3841	–	990	12715	12554	10994
Mediterranean	4496	1702	345	–	589	7132	7595	5887
Other Europe	3906	2057	1692	–	1469	9124	8857	7769
North America	1952	–	3346	–	65	5363	3579	3045
South America	425	261	474	–	55	1215	1778	1652
Japan	514	150	1478	92	358	2592	2652	2335
Australia	42	–	–	3561	–	3603	2594	2074
Others	692	364	2148	27	2152	5383	4782	3457
Total 1978	16905	7540	13324	3680	5678	47127		
Total 1977	15448	7493	13276	2679	5495		44391	
Total 1976	14512	6400	9169	2088	5044			37213

Notes: Import statistics are used whenever possible. Imports to East European Countries from USSR are excluded. Australia includes New Zealand.

Source: Same as Table 3-15

3.3.2 Supply of Dry Bulk Carrier

The dry bulk carrier fleet (including combination carriers), which showed an increase of 14.5 million dw/t of 8.9% in 1977, increased by only 6.1 million dw/t or 3.4% in 1978, both compared with each preceding year. The slowdown was due to moderation in the placement of orders with shipyards.

Table 3-20 The Growth of the World Dry Bulk Carrier Fleet

Unit: '000 dwt

	1975	1976	1977	1978
Ore Carriers	11,495	11,660	12,183	11,705
Other Dry Bulk Carriers	90,500	100,383	115,306	122,863
Total	101,995	112,043	127,489	134,568

Source: Shipping Statistics & Economics, H.P. Dreway

The large number of dry bulk carriers assigned to service in 1975~76 were ships completed to orders placed to substitute for cancelled tanker orders. The supply pressure decreased after that as a result of restraints in the placement of orders, as shown by the fact that about half of the ordered ships, totalling 8.3 million dwt, were under construction. Because seaborne trade demand itself decreased, a surplus ship tonnage of 20 million dwt came into being at the end of the year. (The decrease in the ton-mileage of the major three cargo items was 5.1% below the preceding year.) Of the said suplus tonnage, 8 million tons were laid up, 9 million dwt were slow-steamed and 3 million dwt were absorbed in port congestion. This figure does not include tonnage in inefficient operation, such as operation with cargo partly loaded and voyages in ballast.

Under such circumstances, scrapped ships during the year totaled 2.5 million dwt or one-third of the tonnage of new completions.

Table 3-21 Bulk Carrier Statistics

	Bulk Carrier	Combined Carrier		Bulk Carrier	Combined Carrier
World Bulk Fleet (in Million D.W.T.)			New Contract 1975 – '78 ('000 D.W.T.)		
at the end of					
1975	105.7	44.2	1975	13700	1800
1976	116.6	46.8	1976	9300	1600
1977	129.6	48.3	1977	6300	400
1978	135.3	48.7	1978	1300	500
Deliveries of Newbuilding ('000 D.W.T.)			Total Order Book ('000 D.W.T.)		
			end of		
1975	8241	2604	1975	26222	6493
1976	11623	2783	1976	23425	4488
1977	13562	2155	1977	13496	3075
1978	7769	1312	1978	5859	2115
Tonnage laid up (in Million D.W.T.)			Slow Steaming, DWT Equivalent (in Million D.W.T.)		
end of			Average year		
1975	1.4	5.2	1975	1.2	2.0
1976	0.9	3.3	1976	6.9	2.9
1977	3.8	6.3	1977	7.8	3.8
1978	2.6	2.8	1978	8.4	2.4

Tonnage Broken up and lost
('000 D.W.T.)

	Dry Cargo Ships
1975	2600
1976	3100
1977	3500
1978	5300

Source: Fearnley & Egers Chartering Co., "Review 1978", "World Bulk Fleet", Jan. 1979

3.3.3 Bulk Carriers on Order and Future Tonnage

The bulk carrier order backlog as of December 31, 1978, totaled 8 million dwt, including combination carriers. This was one-fouth of the 32.7 million dwt backlog as of the end of 1975. The charter rate generally rose during the second half of 1978, and the prices of secondhand ships also rose. There was the impression that the light at the end of the tunnel was seen, but the majority opinion is that no optimism is warrantable for at least two years.

The market for relatively small bulk carriers is showing signs of an upturn and because of a rise in the bunker price, slow steaming is becoming a chronic and normal state. But the excessive tonnage is unlikely to disappear soon because of the slowdown in the growth of maritime transport demand. (The growth rate is estimated at 4~5 annually.) Large bulk carriers pose a particularly difficult problem because of competition from combination carriers.

The supply pressure is decreasing annually, but it will not be earlier than the mid-1980s, according to a forecast by the OECD's Shipbuilding Working Party of the Council, that the supply-demand relations for ship tonnage recovers equilibrium because in addition to the backlog of shipbuilding orders, new shipbuilding orders of 20 million to 25 million dwt will be placed between 1979 and 1985. Even by the most optimistic forecast, equilibrium will be attained in 1983~84.

Table 3-22 World Order Book, Year of Delivery, as of end 1978 (in Million D.W.T.)

	Bulk Carrier	Combined Carrier
1979	4.2	1.4
1980	1.3	0.5
1981	0.4	0.2
Total	5.9	2.1

Table 3-23 Estimated Bulk Carrier Fleet (in Million D.W.T.)

	Bulk Carrier	Combined Carrier
1979	136.5	49.1
1980	136.0	48.4
1981	135.5	47.6

Source: Fearnley & Egers Co., "Review 1978"

3.3.4 Dry Cargo Market

Seaborne trade of five main dry cargo items in 1978 totaled 667 million tons, showing an increase of 3.4% over 645 million tons in the preceding year. On the ton-mile basis, which shows the supply-demand balance more accurately, such trade increased by 3.0% from 3,124 billion ton-miles in 1977 to 3,219 billion ton-miles in 1978. The percentage increase in ton-mileage was smaller than that in simple tonnage.

Regarding the supply of ship tonnage, the supply of bulk carriers increased by 7.9% from 124 million dwt in mid-1977 to 134.5 million dwt in mid-1978. If combination carriers are included, the increase was 7.0% from 147.5 million dwt in mid-1977 to 158 million dwt in mid-1978. As a result, the overall supply-demand balance worsened. However, the charter rate according to Fearnley & Egers rose by about 30% over the preceding year.

The dry cargo market in 1978 enjoyed two booms despite the deterioration of the supply-demand balance for ship spaces. For all cargo items, the dry cargo market was very depressed from the beginning of the year. This was because the forwarding capacity in the United States dropped as a result of an explosion in a grain elevator, the intensification of ship congestion due to the advent of a cold wave, etc., and because coal shipments from the United States stopped as a result of the coal mine strike. Later, however, ship congestion improved, grain shipments to the USSR started and China made purchases of American grain. Moreover, coal shipments from the United States resumed following the settlement of the coal mine strike. For these reasons, the grain market in the Atlantic between the U.S./Gulf and Europe gradually improved from the second half of March for both small and large ships, and was in a favorable condition in May and June. The market slightly sagged in July but rose again toward November, however the improvement was short-lived, and the market again declined in December.

The dry cargo market share of the spot market is 3.7% for coal (this is the share which spot contracts totalling 4.8 million tons, according to the Maritime Research Inc., occupies in total seaborne coal trade of 132 million tons, according to Fearnley & Egers – throughout), 48.5% for grain (62/127.4 million) and 3.9% for iron ore (11/278.4 million). We infer that slightly less than half of grain cargo in the world is fixed on the spot market. Because of this large share, trends in supply and demand of grain considerably affects the dry cargo spot market.

Materials for steel making, such as iron ore and coal, are mostly carried under long-term contracts between carriers and steel mills. Accordingly, seaborne trade of steel-making materials depends on the capacity utilization ratio of the iron and steel industry.

Crude steel production in the United States in 1978 showed an increase of 9.3% over the preceding year and that in the six EC countries increased by 6.1%. Because both the United States and the EC procure the greater part of steel-making materials within their own territories, increases in steel production in such countries do not directly cause seaborne trade of steel-making materials to increase.

Crude steel production in Japan, which accounts for more than 50% of world seaborne trade of iron ore and coal on the ton-mile basis, showed a decrease of 0.3% in 1978. The average annual growth rate of crude steel production in Japan during the period from 1973, the year of the first oil crisis, to 1978, was minus 3.1%. The corresponding figure for the United States is minus 1.9%

and the figure for the six EC countries is also minus 1.9%. The decrease in Japan was conspicuous.

Crude steel production in Japan was 119.3 million tons in 1973, 117 million tons in 1974, 102.3 million tons in 1975, 107.4 million tons in 1976, 102.4 million tons in 1977 and 102 million tons in 1978. Under such circumstances, seaborne trade of iron-making materials to Japan was stagnant. Moreover, large bulk carriers are relatively young in age. For these reasons, the supply-demand imblance on the dry bulk cargo market is serious.

The Tramp Freight Index of the Norwegian Shipping News formed one peak in May and the Time Charter Index of the same source formed a peak in June. The causes of that were mentioned earlier. Later, slight declines were seen in summer. After that, both the Tramp Freight Index and the Time Charter Index were firm in their behavior from autumn to the end of the year. The firmness of the dry cargo market at the end of 1978 was partly due to the fact that the tanker market rose and combination carriers, which have much weight in the large dry bulk carrier fleet, moved to oil trade, attracted by a sharp increase in tanker demand.

The rise in the tanker rate was a result of speculative demand for oil in anticipation of another increase in the crude oil prices at OPEC's general meeting in Caracas in December, but the rate is still rising. The firmness of the tanker market must have favorably affected the dry cargo market through combination carriers. The dry cargo market received another favorable stimulus when seaborne trade of steel-making materials showed signs of an increase at the end of the year. Generally, the dry bulk cargo market in 1978 was firm despite the deterioration of the supply-demand balance.

It should be noted, however, that both the Tramp Freight Index and the Time Charter Index of the Norwegian Shipping News, like those of the Maritime Research Inc., are based on the dollar values of contracts in the basic year (in the case of the Norwegian Shipping News, the level in July 1965-June 1966 is 100) and they are not deflated to be adjusted for the drpreciation of the dollar after the basic year. Accordingly, they are nominal values and their trends should not be accepted at their face value. Nippon Yusen Kaisha announces its own index calculated by deflating the Norwegian Time Charter Index by the depreciation of the dollar against the Special Drawing Rights. According to the NYK Index, the levels in May and June are higher than the level at the end of the year.

Table 3-24 Dry Bulk Cargo Freight Rates by Main Routes

			1976 High · Low	1977 High · Low	1978 Q1 High · Low	1978 Q2 High · Low	1978 Q3 High · Low	1978 Q4 High · Low
	U.S. Gulf/Japan	A	17.50~11.00	16.00~ 9.15	14.25~10.53	16.75~12.64	15.00~14.00	17.50~15.00
		B	13.50~12.00	15.00~ 9.23	12.25~ 6.95	12.00~ 8.75	13.00~10.75	17.50~14.50
		C	–	5.65	8.15~ 7.00	9.25~ 8.30	7.92	–
	U.S. Gulf/Japan	A	18.25~ 9.75	17.00	16.75~12.64	20.85~17.75	23.00~18.95	–
		B	14.75~ 7.00	13.50~ 8.00	12.00~ 8.75	16.50~10.50	17.75~10.00	16.00~11.50
		C	10.50~ 7.25	10.05~ 8.00	9.25~ 8.30	14.85~ 9.50	11.90~10.00	13.75~11.50
	U.S. Gulf/W.Europe	A	13.00~12.50	13.50~ 8.57	11.50	–	–	–
		B	10.00~ 4.05	11.80~ 4.50	6.75~ 5.25	10.50~ 5.20	7.63	13.60~ 7.75
		C	8.10~ 3.85	6.35~ 3.75	6.25~ 4.35	8.50~ 5.00	7.50~ 4.75	10.50~ 6.75
	Great Lakes/W.Europe	A	21.50~13.50	23.00~10.50	19.50~14.00	23.50~15.75	23.00~14.00	27.375~16.25
		B	–	13.50~12.25	17.25	17.25	14.00	–
		C	–	–	–	–	–	–
	Hampton Roads/Japan	A	–	–	–	–	–	–
		B	11.00~ 8.50	7.00	8.90	–	13.75~10.50	–
		C	8.00~ 4.55	7.45~ 5.40	–	9.60~ 5.30	8.05	11.00~ 8.50
	Tubarao/Japan	A	–	–	–	–	–	–
		B	–	7.50~ 7.25	7.95~ 7.50	–	–	–
		C	7.50~ 3.75	8.375~ 3.50	6.50	–	4.25	–
	Northern Range/Japan	A	–	12.00~10.62	–	16.00	–	22.00
		B	18.00~14.00	15.00~ 8.00	16.50~10.00	18.50~14.50	21.88~16.00	23.50~14.50
		C	–	–	–	–	–	–
	Dry Cargo Ship (One Year)	α	5.50~ 3.89	6.90~ 3.25	–	4.94~ 4.25	5.95~ 4.91	5.50~ 4.62
		β	4.50~2.375	3.25~ 1.98	–	4.42~ 3.37	3.72	3.60~ 3.55
		γ	3.25~ 1.35	2.60~ 0.95	–	2.25~ 0.875	2.40	3.20~ 2.15

A . . . . . Under 20,000 D/W
B . . . . . 20,000~50,000 D/W
C . . . . . Over 50,000 D/W

α. abt. 25,000 D/W
β. abt. 40,000 D/W
γ. abt. Pana-max

Table 3-25 Dry Bulk Carrier Laid up and Slow-Steaming

Year	Laid ups		Slow-Steamings	
	Bulk Carrier	Combined Carrier	Bulk Carrier	Combined Carrier
1975 1, Jul.	0.8 (0.7)	4.7 (3.5)	(1.2)	(2.0)
1976 1, Jan.	1.4	5.2		
1, Jan.	1.3 (1.3)	5.2 (4.6)	(6.9)	(2.9)
1977 1, Jan.	0.9	3.3		
1, Jul.	2.0 (2.3)	3.6 (4.5)	(7.8)	(3.8)
1978 1, Jan.	3.8	6.3		
1, Jul.	3.9 (3.4)	7.6 (6.5)	(8.4)	(2.4)

Note: Figures in Parentheses are Average.
Source: Fearnley & Egers, "World Bulk Fleet"

Table 3-26 Freight Rate and Time Charter Index (Weekly)

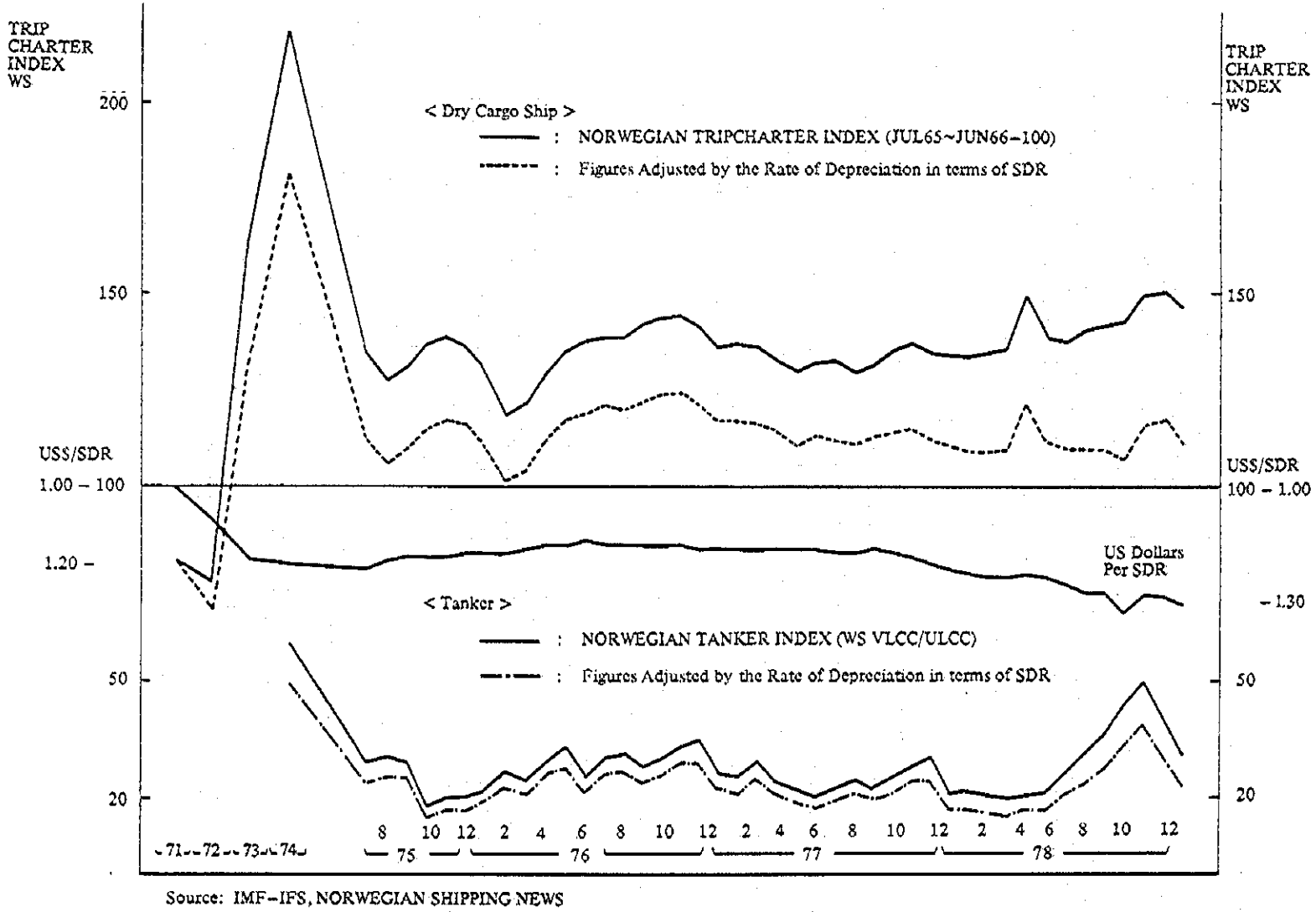
Month	Week	Freight Rate (1972 = 100)			Time Charter (1972 = 100)	
		Total	Grain	Others	6 Months over	1~2 Months
1977	40	166.5	158.1	184.6	126.1	123.0
10	41	169.8	162.3	185.8	117.8	119.7
	42	170.7	163.3	186.7	123.8	125.3
	43	172.4	164.5	189.5	125.4	118.0
	44	175.7	168.6	191.1	132.7	112.4
	45	174.3	167.4	189.4	140.3	123.6
11	46	174.4	166.9	190.5	145.2	137.2
	47	172.8	165.1	189.4	128.7	123.6
	48	172.0	163.0	191.7	132.0	137.6
	49	173.1	163.6	193.6	135.3	134.0
12	50	174.2	165.4	193.1	135.3	130.6
	51	173.9	164.6	194.3	(135.3)	125.0
	52	174.7	165.4	194.8	145.2	122.2
1978	1	175.7	166.8	194.8	(145.2)	126.7
1	2	173.2	163.1	(194.8)	(145.2)	135.4
	3	172.5	162.3	194.5	145.2	143.5
	4	174.4	165.2	194.5	143.6	127.5
	5	168.0	156.5	192.7	143.6	122.2
2	6	169.0	157.8	193.2	143.6	129.2
	7	167.5	156.2	192.3	146.9	134.8
	8	168.2	156.9	192.6	138.6	146.1
	9	168.8	157.5	193.3	146.9	136.8
3	10	169.3	158.0	193.9	150.2	147.5
	11	171.5	160.4	195.5	147.5	133.4
	12	173.1	162.8	195.5	148.5	134.8
	13	171.7	160.7	195.6	135.3	143.5
	14	173.6	163.5	195.6	139.6	141.9
4	15	175.8	166.3	196.2	136.3	155.9
	16	177.7	169.0	196.6	139.6	162.9
	17	179.4	171.0	197.6	141.3	168.5
	18	180.0	170.4	200.8	147.9	177.0
5	19	183.7	174.3	204.0	145.2	165.7
	20	188.5	179.5	208.8	142.2	168.5
	21	197.7	190.4	213.6	158.7	181.2
	22	205.0	199.7	216.3	156.8	167.1
6	23	204.0	197.7	217.4	160.7	161.6
	24	201.6	195.3	215.1	155.8	181.5
	25	196.3	188.5	213.0	154.5	178.7
	26	195.2	187.5	211.8	151.2	167.1
7	27	196.0	188.9	211.4	151.2	161.0
	28	196.6	190.0	210.9	157.8	165.2
	29	195.0	187.9	210.1	161.7	154.8
	30	196.0	189.2	212.6	(161.7)	151.7
	31	194.5	186.5	213.7	162.8	147.5
8	32	193.5	185.4	210.9	160.1	153.1
	33	196.3	188.8	212.4	165.0	160.1
	34	198.0	191.0	213.3	173.2	162.9
	35	199.3	192.7	213.3	(173.2)	162.1
	36	200.9	194.6	214.3	(173.2)	156.7
9	37	205.0	199.0	217.8	181.5	165.7
	38	205.3	200.2	216.2	178.2	172.5
	39	206.6	201.9	218.6	183.2	173.0
	40	205.5	200.3	218.6	184.8	177.0
10	41	205.5	199.5	219.3	191.4	172.2
	42	209.3	203.7	221.2	192.1	179.8
	43	219.1	216.5	224.6	181.5	185.4
	44	226.8	226.2	228.1	188.1	177.0
	45	224.1	221.6	229.2	178.2	179.8
11	46	230.9	226.0	241.2	181.5	185.4
	47	230.5	224.8	242.8	(181.5)	193.8
	48	227.8	220.9	242.5	184.8	182.6
	49	228.0	222.0	240.7	183.8	177.5
12	50	229.1	223.6	240.7	185.5	177.0
	51	228.8	217.9	239.1	188.8	182.6
	52	227.3	216.7	237.5	(188.8)	185.1

Source: Maritime Research

Table 3-27 Freight Rate and Time Charter Index (Monthly)

		Freight Rate (1965.7~66.6 = 100)	Time Charter (1965.7~66.6 = 100)
1968		92.4	92.6
1969		85.2	89.5
1970		119.4	130.9
1971		81.2	104.4
1972		74.5	104.7
1973		161.5	230.1
1974		217.9	300.8
1975		142.0	171.4
1976		134.2	175.4
1977		132.8	164.4
1978		152.5	212.4
1975	7	134.1	145.8
	8	126.5	133.9
	9	129.8	153.4
	10	135.8	161.5
	11	138.0	168.1
	12	135.5	165.5
1976	1	129.0	157.9
	2	118.2	144.3
	3	120.9	154.2
	4	129.1	165.1
	5	134.0	178.0
	6	136.5	188.5
	7	138.2	181.1
	8	138.0	180.7
	9	140.9	186.7
	10	142.7	196.4
	11	143.2	189.0
	12	140.3	182.8
1977	1	135.3	174.8
	2	135.6	168.2
	3	134.7	163.4
	4	132.1	164.9
	5	128.9	163.0
	6	131.2	158.6
	7	131.7	157.6
	8	129.4	155.8
	9	131.3	155.5
	10	134.1	166.3
	11	136.1	171.0
	12	134.3	174.3
1978	1	133.8	175.7
	2	133.1	177.2
	3	134.2	177.0
	4	135.3	189.7
	5	147.9	197.3
	6	138.1	206.6
	7	136.8	196.2
	8	139.5	189.9
	9	140.6	198.8
	10	141.9	207.9
	11	148.8	211.9
	12	149.9	210.0

Source: Norwegian Shipping News



Source: IMF–IFS, NORWEGIAN SHIPPING NEWS

Fig. 3-1 The Effects of U.S. Dollar Depreciation on Dry Cargo Market

CHAPTER 4 SUEZ CANAL TRAFFIC

4.1 General

4.1.1 Vessel Traffic

What is most significant about Suez Canal traffic in 1978 is that the traffic of general cargo ships surpassed that of tankers, though slightly, to rank first in terms of NRTs (net registered tons). Whereas tanker traffic totaled 73,924 thousand NRTs, showing a decline of 2.2% from 1977, general cargo ship traffic amounted to 74,521 thousand NRTs, representing a increase of 11.9% by the same comparison. In addition to general cargo ships, containerships and bulk carriers registered marked increases of 37.9% and 40.4%, respectively, in transit through the Canal. Car carrier traffic also posted at 70.6% boost although their tonnage was relatively small. (See Table 4.1)

The increase in containership traffic is considered to reflect the progress in development of container facilities, especially in the Arabian Gulf, and an increase in container cargo movements. Ro-ro ship and LASH ship traffic through the canal in 1978 decreased by 4.5% and 16.6%, respectively. Ro-ro and LASH ships once played an active role in transportation to the Arabian Gulf when serious port congestion prevailed in the area. But, it is understood that, as the port congestion is being dissolved as a result of a progress in improvement of port facilities in this area, those vessels are giving way to other types such as containerships which require less costs.

Coupled with increased cargo movements, the rise in dry cargo market rates, particularly in the latter half of 1978, seems to have contributed something to the increase in bulk carrier traffic through the canal. At any rate, data on O/D (origination/destination) for each ship type are necessary to make further analysis of the canal traffic. Tanker traffic is expected to regain the first position sometime after the autumn of 1980 when the Suez Canal's First Stage Development Project is to be completed. When considering the future oil situation, however, it is assumed that the importance of non-tanker vessels will continue to increase in the long-range, particularly the importance of general cargo ships and containerships carrying general cargo and industrial products rather than those types carrying dry bulk cargoes such as bulk carriers and combination carriers. The average NRTs by ship types are shown in Table 4-1. The overall NRT average did not change so much, but, the average of all ship types' NRTs except for tankers' has been growing at a rate of about 10% a year. Whereas the average NRTs of car carriers and ro-ro ships are becoming larger in these three years, those of other ship types show little change. Thus, it is believed that the above-mentioned increase in the NRT average of non-tanker ships has resulted from the fact that the fleet composition of non-tanker vessels has changed and such ships as bulk carriers and containerships, including large-sized ones, have been increasing.
been increasing.

Table 4-1 Transited Tonnage and Average Ships' Size by Type

(Unit: 1,000 N/T)

Year / Type	1976 NRT (1,000 N/T) No.	1976 Ar. N/T	1977 NRT (1,000 N/T) No.	1977 Ar. N/T	1978 NRT (1,000 N/T) No.	1978 Ar. N/T	Increase/Decrease Δ 1977 – 1978 (%)
Tanker	77,003	29.503	75,568	28.843	73,924	29.700	Δ 2.2
	2,610		2,620		2,489		
Bulk Carrier	23,395	14.549	26,202	14.413	36,783	14.637	40.4
	1,608		1,818		2,513		
Combined Carr.	4,765	43.318	5,722	38.925	5,518	38.319	Δ 3.6
	110		147		144		
General Cargo	59,339	6.062	66,587	6.070	74,521	6.358	11.9
	9,789		10,970		11,721		
Container	4,545	10.899	21,604	19.119	29,795	19.903	37.9
	417		1,130		11,437		
LASH	2,296	33.275	2,538	30.951	2,117	30.681	Δ16.6
	69		82		69		
RO / RO	7,605	6.706	12,218	7.636	11,673	8.350	Δ 4.5
	1,134		1,600		1,398		
Car. Carrier	5,411	20.973	5,748	23.752	9,805	26.287	70.6
	258		242		373		
Passenger ship	709	12.891	1,026	12.667	987	11.345	Δ 3.8
	55		81		87		
War ship	334	3.670	604	6.040	405	3.320	Δ32.9
	91		100		122		
Others	1,457	2.191	2,660	2.913	2,732	3.203	2.7
	665		913		853		
Total	186,859	11.119	220,477	11.190	248,260	11.674	12.6
	16,806		19,703		21,266		
Non-Tankers	109,856	7.739	144,909	8.483	174,336	9.285	
	14,195		17,083		18,777		

Source: Suez Canal Report

4.1.2 Goods Traffic

In 1978 goods traffic through the Suez Canal, northbound cargoes declined by 4.2% from 1977, and southbound cargoes showed a marked increase of 43.0% in sharp contrast. Oil traffic which accounts for 41% of the entire northbound cargo traffic through the Canal decreased by 8.1%. Among other principal northbound goods, fabricated metals dropped by 43.5% and ores and metals dipped by 1.4%. The northbound traffic of dry cargoes as a whole almost leveled off with a mere 1.2% decline. Each of the dry cargo items except for fabricated metals did not show any major change in traffic. The northbound cargo trade through the Canal can be described as being in a developed state.

Meanwhile, the southbound trade through the Canal can be described as a developing trade since some specific cargo items' movements have been growing sharply. Cement traffic jumped to the top in 1978 by registering an 86% boost compared with 1977. Because of the construction boom in the Red Sea and the Arabian Gulf regions, much of the Canal transit of cement is from the Mediterranean Sea and the Black Sea areas. Fertilizers held second place with an increase of 45.6%. Fabricated metals came next with a rise of 102.8%, followed by cereals with a gain of 24.7% and oil with an increase of 18.4%. The movements of cargo items other than the 25 items named in the SCA statistics accounted for 38% of the entire southbound traffic through the Canal in 1978. The total volume of the unspecified items' movements jumped by as much as 43.7% from 1977. Many of these items are believed to be general cargoes which are carried on container-ships and general cargo ships.

The sharp increases in the southbound movements of cement, fabricated metals and general cargoes were caused by the growing demand for such items in the Middle East. But, it should also be noted that the canal traffic of such industrial products tends to fluctuate greatly depending on the development of competitive relationship between European exporters and Asian exporters (particularly Japanese exporters). The movements of these and other principal items are examined in detail in Section 4-2 and following sections of this chapter.

Table 4-2 Volume of Northbound Goods Traffic by Categories

(Unit: 1,000 M/T)

Goods	1966	1976	1977	1978
Crude oil	154,092	23,926	23,912	20,997
Oil products	12,626	5,929	6,965	7,366
Total	166,718	29,855	30,878	28,363
Iron ore	6,490	4,018	4,035	3,901
Non-ferrous mineral ore		3,834	3,267	3,302
Fabricated metals		6,357	5,401	3,054
Cereals	1,787	2,712	1,592	1,139
Vegetable oils	1,558	1,098	1,089	1,169
Textile Fibres	1,838	769	694	476
Oil Seeds		1,686	1,183	906
Oil Seed Cakes		1,677	1,386	1,065
Wood		2,876	2,176	2,046
Fertilizers		1,145	1,142	1,475
Rubber		1,064	925	681
Suger		1,171	1,073	516
Molasses		612	684	673
Starch & farinas		806	1,028	2,117
Coal & coke		510	841	1,543
Machinery & parts		805	906	899
Textile		440	460	270
Chemicals & products		391	397	302
Minerals & rocks		313	367	354
Fruits		340	331	259
Coffee		323	288	210
Tea		286	309	154
Spices		78	81	43
Fish		86	89	147
Others	15,777	8,768	12,008	14,533
Total	27,440	42,165	41,752	41,234
Total	194,158	72,020	72,630	69,597

Source: Suez Canal Report

Table 4-3 Volume of Southbound Goods Traffic by Categories

(Unit: 1,000 M/T)

Goods	1966	1976	1977	1978
Grude oil	2,893	500	639	619
Oil products	6,060	3,469	3,428	4,197
Total	8,953	3,969	4,067	4,816
Cereals	9,738	5,143	4,188	5,221
Fertilizers	6,748	5,492	6,197	9,025
Fabricated metal	5,015	3,744	3,893	7,894
Sugar	1,231	446	801	1,672
Machinery & parts	1,464	1,605	1,354	978
Cement	1,407	4,631	6,035	11,226
Chemicals & products	1,017	1,456	1,766	1,986
Wood pulp and paper	675	480	651	868
Metal Ores		1,326	1,341	1,581
Food Stuffs		1,254	1,839	2,064
Wood, timber & Lumber		736	622	619
Minerals & rocks		440	430	460
Cotton		354	317	224
Coal and coke		238	331	272
Lubricating oils		195	319	200
Textiles		99	127	99
Railway materials		161	49	48
Military stores		81	117	87
Drinks		71	74	46
Glass & Glass ware		55	75	67
Paints and dyestuffs		44	58	55
Tabacco		34	34	34
Asphalt		34	101	70
Other	11,477	13,545	21,277	30,580
Total	38,772	41,664	51,996	75,376
Total	47,725	45,633	56,063	80,182

Source: Suez Canal Report

4.2 Petroleum

Northbound traffic of petroleum through the Canal in 1978 aggregated 28,363 thousand tons which was a decrease of 8.1% from the previous year. Of this, crude oil amounted to 20,997 thousand tons, a decrease of 12.2% and oil products 7,366 thousand tons, a gain of 5.8%. The total world petroleum movement in the same year was 1,441.5 million tons, a drop of 1.7% from the preceding year's 1,466.7 million tons. Of this world traffic of petroleum, 391 million tons were in the Arabian Gulf/N.W. Europe, Mediterranean trade. This was a decrease of 8.1% from the preceding year's 425.4 million tons. The decrease in the petroleum traffic through the Canal, noted above, is related to the decrease in European oil imports. The economic background of the decrease in cargo movement in 1978 was surveyed in Chapter 3.
was surveyed in Chapter 3.

With the volume of petroleum transited through the Canal decreasing, tanker traffic through the Canal, too, dropped by 2.2% in terms of NRT. As for details about petroleum and tanker transit, they have been analyzed from various angles in Suez Canal Report 1978. Thus they will not be taken up here. The point that needs to be noted about 1978 traffic is that in the second half of the year (July~December), transit of southbound VLCC increased sharply (38 tankers in the first half of the year and 156 in the second half). It has been analyzed that the reason for this is the steep rise in the tanker market in the second half of the year. Please refer to table comparing the VLCC tanker market with the monthly traffic according to ship size and northbound or southbound. (See Table 4-4, 4-5, Fig. 4-1) For details, please refer, as in 4.1 above, to the Research Report (September 1979) of the Economic Unit.

Table 4-4 Transited Southbound Tankers of 150,000 – 200,000 and over 200,000 D.W.T.

	150,000 – 200,000							Over 200,000								
	1 Gr.	2 Ad. Sea	3 W.C.It.	4 Fr. Sp.	5 N.W.Eu.	6 Canada	7 Car. Sea	1 Gr.	2 Ad. Sea	3 W.C.It.	4 Fr. Sp.	5 N.W.Eu.	6 Canada	7 Car. Sea	Total	W.S.
1978																
January		2		1	1				1		1	2			8	20.4
February		1		1	2				1		1	1			7	20.6
March		1			1				1			1			4	19.5
April		2		1	1				1		2	1			8	19.0
May		1		1					2					1	5	20.3
June		2		1							1	1	1		6	21.2
July					1	1			2			2			6	26.3
August		2			3			4	2	3	1	9			24	31.0
September		2		2	1			1	1	2	3	9			21	35.9
October		1	1	1	2			2	2	3	4	19			35	44.9
November		2		2	3			2	2	2	5	21	1	1	41	49.8
December				1				2	4	3	4	15			29	40.0
Total		16	1	11	15	1		11	19	13	22	81	2	2	194	29.1

Area of previous port of call before transiting the canal

1 : Greece, Turkey

2 : Adriatic Sea, Ionian Sea & Sicily

3: West Coast Italy, Corsica, Sardinia,

4 : France, Spain, Morocco, (Mediterranean) Canary Is.

5 : N. W. Europe

6 : Canada

7 : Caribbean Sea, Bahama

Source: S.C.A. "List of Transited VLCC"

Table 4-5 Transiting Tankers by Dead Weight

		Up to 20,000	20,001 – 40,000	40,001 – 60,000	60,001 – 80,000	80,001 – 100,000	100,001–150,000	150,001–200,000	Over 200,000	Total	Freight Index* VLCC/ULCC
South/North	1978										Source: Norwegian Shipping News*
	January	18	42	11	11	8	2	1	–	93	
	February	16	28	16	11	13	–	–	–	84	
	March	15	39	17	12	12	–	–	–	95	
	April	19	41	13	6	13	–	–	–	92	
	May	18	32	16	5	11	–	–	–	82	
	June	15	33	11	9	9	–	–	–	77	
	July	17	30	13	7	5	–	–	–	72	
	August	16	32	12	6	7	–	–	–	73	
	September	28	30	13	6	7	–	–	–	84	
	October	19	33	11	10	9	1	–	–	83	
	November	24	51	17	7	10	6	–	–	115	
	December	14	38	12	8	15	4	–	–	91	
	Total	219	429	162	98	119	13	1	–	1,041	
North/South	1978										
	January	13	35	11	14	11	18	3	4	109	20.4
	February	20	34	17	11	16	8	4	3	113	20.6
	March	25	41	22	12	15	13	2	2	132	19.5
	April	17	38	19	11	22	11	4	4	126	19.0
	May	20	31	15	7	15	14	2	3	107	20.3
	June	19	27	15	9	12	16	3	3	104	21.2
	July	22	30	11	8	13	12	2	4	102	26.3
	August	14	31	17	6	9	13	5	19	114	31.0
	September	19	27	11	10	16	16	5	15	119	35.9
	October	18	35	15	9	12	9	5	30	133	44.9
	November	22	23	15	7	12	13	7	34	133	49.8
	December	21	38	13	12	23	20	1	28	156	40.0
	Total	230	390	181	116	176	163	43	149	1,448	29.1
	Grand Total	449	819	343	214	295	176	44	149	2,489	

Source: Suez Canal Report

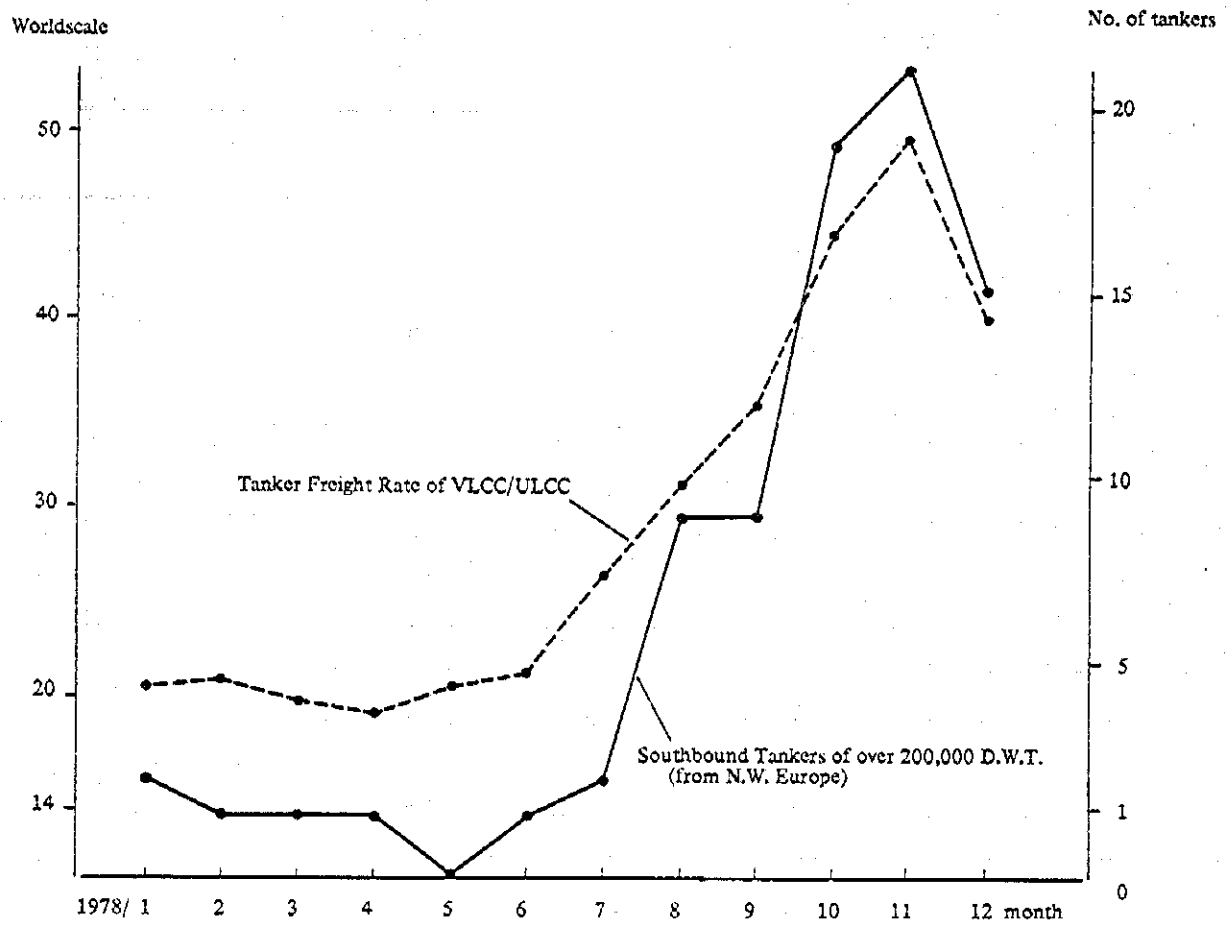


Fig. 4-1 Tanker Market and Transiting VLCC

4.3 Iron Ore

The volume of iron ore moved by sea in the world is as follows:

1976	293.8 million tons
1977	297.6 million tons
1978	278.3 million tons

The reasons for the decrease in the seaborne iron ore traffic in 1978 were expalined in detail in Chapter III.

The volume of iron ore transited through the Canal, according to the Suez Canal Annual Report, is as follows.

Table 4-6 Transited Volume of Iron Ore 1976 – 1978

(Unit: 1,000 ton)

	1976	1977	1978
Northbound	7275	4038	3904
Southbound	1000	1000	1000
Total	8275	5038	4904

The Annual Report lumps iron ore in the same category as bauxite, mangenese, copper, tin, zinc and other minerals. The statistics for northbound traffic indicate the percentage of iron ore, thus exact figures were available. For southbound traffic, there is no percentage given. The Iron Ore Seaborne Trade Matrix compiled by Fearnley & Egers shows that 1 million tons of iron ore are moved Other Europe/Japan, with Other Europe presumed to include Poland and the Soviet Union as origins. This figure corresponds closely to volume of the long-term contract which Japanese mills have with the region in question. Consequently, of the southbound figures for metals and ores (1.33 million tons in 1976, 1.34 million tons in 1977, and 1.6 million tons in 1978), 1 million tons were regarded each year to have consisted of iron ore.

The two conceivable northbound iron ore trades through the Suez Canal are:

India/Europe (including East Europe), and
Australia/Europe (including East Europe).

The trade volume on these two trades (in 1,000 M/T) can be obtained from data of Fearnley & Egers, as follows:

	1976	1977	1978
From Asia to UK/Cont., Medit., Other Europe	2,190	1,707	1,175
From Australia to UK/Cont., Medit., Other Europe	12,192	15,630	14,688

It is believed that of the above, the total amount of India/Europe trade passes through the Suez Canal. A greater part of the Australia/Europe trade is believed to move via Cape Hope without using the Canal. This is because relatively large bulk carriers (in 1978, 71% were over 100,000 tons) are in service in this trade. Thus, the rate of dependence on the Canal of the Australia/Europe trade was no more than 14.9% in 1977 and 18.6% in 1978.

This fact means that when the First Stage Development is completed, there is a potential for new demand for Canal use by big ships up to the draft limit.

4.4 Coal

The world coal production in 1978 totaled 2,661 million tons, with the main production centers being the Soviet Union, China, U.S., Poland, United Kingdom, West Germany, South Africa and Australia. The coal consuming regions, mostly coking coal for steel-makers, are West European countries, Mediterranean countries, and Japan. The seaborne trade volume of coal, according to Fearnley & Egers in as follows:

1976	126.8 million tons
1977	131.9 million tons
1978	126.5 million tons

The following values are derived when the OD table of coal seaborne trade matrix connected with the Suez Canal is compiled:

	1976	1977	1978
From Australia to UK/Cont., Medit., and Other Europe	4,017	6,706	6,733
From East and Other Europe to Japan	2,354	2,122	998

This shows that, for the Suez Canal, Australian coal destined for Europe creates northbound demand and East European coal destined for Japan creates southbound demand.

The Suez Canal Report shows that the transited volume of coal, separated into northbound and southbound, is as follows (in 1,000 M/T):

Table 4-7 Transited Volume of Coal 1976 – 1978

(Unit: 1,000 ton)

	1976	1977	1978
Northbound	510 (12.7%)	841 (12.5%)	1543 (22.9%)
Southbound	238 (10%)	331 (15.6%)	272 (27.3%)
Total	748	1172	1815

Source: Suez Canal Report 1978

The volume of coal transited through the Suez Canal at present is not even 1% of the world's total seaborne cargo movement. However, coal accounts for a big share of the cargoes moved through the Canal, as shown by the percentages in brackets in the above table. Particularly, in 1978, coal's share increased dramatically to 23% of northbound and 27% of southbound cargoes.

Australia has become increasingly important in recent years as the supply source of coking coal. Coal, moreover, is being re-examined as an alternative energy to oil. Thus, it is expected that demand for steam coal will rise steeply in the future. This, of course, will increase the demand for transit through the Canal. The increase in demand resulting from the widening of the Canal, too, is expected to be considerable. At present, 60% of the coal shipped from Australia is transported on large ships of over 60,000 dw/t. The Mediterranean countries, too, depend on ships of more than 60,000 tons for 45% of their coal shipments. For these two reasons, the transit of coal through the Canal can be expected to increase greatly when the Canal widening project is completed.

4.5 Cereals

The main suppliers of cereals are the United States, Canada, West Europe, Argentina and Australia The main importers of cereals are West Europe, Japan, North Africa, Middle East countries, Latin American countries, India, Pakistan and Southeast Asian countries. The volume of world cereal trade was as follows:

1976	146.3 million M/T
1977	147.3 million M/T
1978	169.3 million M/T

With respect to importing countries, the cereal trade routes related to the Suez Canal involve Iran, Iraq, Saudi Arabia and other Persian Gulf countries, Jordan, Saudi Arabia, Suden, Somali, Yemen and other Red Sea countries, and some of the Southwest and Southeast Asian countries. Almost all of the supply come from the U.S. Gulf and the Great Lakes, with part originating in West Europe and shipped bags to the above importing countries. It is believed that most of the cereals supplied through the U.S. Pacific Coast and Vancouver (Canada) to the above importing countries do not depend on the Suez Canal. Cereal exports from Australia are very vigorous but they are shipped via routes which are not related to the Suez Canal. Northbound cereal transiting through the Canal is Southeast Asian rice destined for Europe.

Fearnley & Egers' OD table on American and Canadian cereals do not indicate whether the shipments are from the Atlantic or Pacific coasts. Calculations based on H.P. Drewry's Dry Cargo Fixture Report give the following percentages.

From / To	U.S. Gulf, U.S. NH, Great Lakes & St. Lawrence	U.S.N.P., California & Vancouver
Near East	75.5%	57.0%
Indian Ocean	24.5%	43.0%

Table 4-8 Transited Volume of Cereals 1976 – 1978

(Unit: 1,000 ton)

	Total North and Southbound	Southbound	of which from Atlantic Coast of US and Canada	of which from other regions	Northbound
1976	7855	5143	3347	1796	2712
1977	5780	4188	2413	1775	1592
1978	6360	5221	3009	2212	1139

As of 1978, the Suez Canal's share of the world cereal trade is less than 4%. The demand for cereal transport through the Canal, however, is not necessarily small because countries with low food self-sufficiency and high population growth are relatively numerous along the Persian Gulf and Red Sea coasts. Consequently, the trend of cereal traffic through the Canal is on the increase. Moreover, ships used in the cereal trade at present are overwhelmingly in the 12,000~15,000 dwt class. Thus, even if size-up occurs, the present capacity can adequately cope with it.

4.6 Mineral Fertilizer

4.6.1 Canal Traffic

In the 1978 Canal traffic of dry cargoes, mineral fertilizer held the second place following cement. Its shipments through the Canal in the year amounted to 9,025 thousand tons, an increase of 46% from 1977. The kinds of mineral fertilizers moved through the Canal in the 1976~1978 period and their exporting and importing countries are shown in Table 4.9. Phosphate and urea together accounted for as much as 56% of the mineral fertilizer traffic through the Canal in 1978. Principal exporting countries include the U.S.A., Rumania, Belgium, Morocco and West Germany. But, their ranking has been changing every year. East Asian and South Asian countries with large populations are the principal countries importing fertilizer through the Canal. India and China combined accounted for 55% of the year's fertilizer traffic via the Canal. Pakistan, Iran and Japan also ranked high.

Table 4-9 Transited Volume of Fertilizers by Major Loading and Unloading Countries

(Unit: 1,000 ton)

	1976	1977	1978
Phosphate	1,332	2,137	2,717
Urea	1,231	1,354	2,355
Potass	588	812	855
Ammonium sulphate	545	431	393
Ammonium nitrate	252	216	366
Others	1,544	1,247	2,339
Total	5,492	6,197	9,025
LOADING COUNTRIES			
U.S.A.	609	947	1,209
Germany (Fed.)	448	807	919
Rumania	646	772	1,289
Morocco	417	769	906
Russia	395	640	365
Belgium	485	365	1,136
Holland	416	352	579
Bulgaria	207	220	259
Italy	280	193	569
Others	1,589	1,132	1,791
Total	5,492	6,197	9,025
UNLOADING COUNTRIES			
India	1,498	2,104	2,987
China	1,309	1,329	1,935
Iran	186	422	562
Japan	--	340	444
Singapore	94	242	415
Thailand	292	236	222
Pakistan	389	182	617
Others	1,724	1,342	1,845
Total	5,492	6,197	9,025

Source: Suez Canal Report

4.6.2 Kinds of Mineral Fertilizer

There are many kinds of fertilizer. Their cargo shapes in transportation and their movements differ one from the other. Then here is a brief description of the kinds of mineral fertilizer. Needless to say, mineral fertilizer is basically divided into three types – nitrogen (N), phosphoric acid (P_2O_5) and potassium (K). Nitrogen-type fertilizer is transported as ammonium sulphate ($(NH_4)_2 SO_4$), ammonium nitrate (NH_4NO_3), ammonium chloride (NH_4Cl), urea ($CO(NH_2)_2$) etc. Phosphate-type fertilizer, which is made from phosphate rock, is usually processed into products in consuming countries or areas. Phosphate rock is one of the so-called five major dry bulk cargoes. Its world seaborne transportation in 1978 amounted to 47 million tons. Principal producing countries include the U.S. (Florida), the Soviet Union, Morocco, South Africa and Jordan. Shipments from North America and Morocco to South Asia account for the main portion of phosphate rock movements through the Suez Canal. Shipments to East Asia are chiefly made from North America via the Panama Canal due to distance. Japan gets 60% of her phosphate rock imports from North America and 20% from Morocco. South Korea is getting almost all of her phosphate rock imports from North America. Potassium-type fertilizer is made from potass. Main producing countries are the Soviet Union, Canada, East Germany and West Germany. Potass shipments moved through the Suez Canal are chiefly those from East Germany and West Germany. The Soivet Union is a major producer of both phosphate rock and potass, but her export volumes are comparatively small, because the country consumes large amount.

Both phosphate-type and potassium-type fertilizer shipments are mainly made in the form of rock. But, things are different with regard to nitrogen-type fertilizers. This is because nitrogen-type fertilizers are made from nitrogen contained in air and the above-mentioned fertilizers of the nitrogen type are produced by processing nitrogen into ammonium with the use of natural gas, petroleum, coal, etc. The nitrogen-type fertilizers had been among the principal export products of advanced industrialized nations. But, the production of such fertilizers in the less developed part of the world has been increasing in recent years. The rising energy price has made it possible for natural gas-producing countries to manufacture the nitrogen-type fertilizers at lower costs than oil-importing advanced nations. The transportation pattern for fertilizers of this kind has been changing rapidly.

4.6.3 Production, Exports and Imports

Fertilizer output and export volumes of major exporting countries and import volumes of principal importing countries are shown below.

(1) Phosphate rock production and export volumes of Morocco and the U.S. are shown in Table 4-10.

As mentioned earlier in this section, part of phosphate rock shipments from the U.S. to Asia and shipments from Morocco to Asia are made via the Suez Canal. The volume of shipments from Morocco shown in SCA statistics seems a little smaller than the export volume reported by that country.

Table 4.11 shows import volumes of principal importing countries. It is not clear how much each importing country purchased from which nation. But, available data show that India during 1976 imported 127 thousand tons from Morocco, 237 thousand tons from the U.S. (probably

via the Suez Canal) and 131 thousand tons from Jordan. For both Japan and South Korea, a breakdown of import volume by exporting nations is as mentioned earlier in this section. No data is available for making such a breakdown for Chinese and Iranian imports.

In the meantime Morocco is now trying to refine phosphate rock into phosphoric acid (P_2C_5) themselves instead of exporting phosphate rock. Thus, there is seen a move to construct small tankers for transportation of phosporic acid. At present, however, this move is not thought to progress so rapidly. When phosphate rock is processed into phosphoric acid, the shipment volume is reduced to about one-third.

Table 4-10 Productions and Exports of Phosphate Rock by Major Sources

(Unit: Million ton)

From / To	Morocco		USA		USSR	
	1977	1978	1977	1978	1977	1978
West Europe	9.6	11.0	5.2	4.5		
East Europe	3.1	2.9	1.5	1.3		
Asia	1.1	1.3	3.4	3.8	(n.a.)	(n.a.)
N. America	0.3	0.9	2.7	3.3		
Latin America	1.6	1.6	1.2	0.9		
Exports Total	15.8	17.7	14.0	13.7	4.2	(n.a.)
Productions	17.0	19.3	46.4	49.7	24.3	(n.a.)

Source: Phosphorus and Potasium Feb. & Apr. 1979
FAO "Fertilizer Yearbook 1978"

Table 4-11 Main Importing Countries of Phosphate Rock

(Unit: Million Ton)

	1976	1977
China	1.5	1.5
India	0.5	1.1
Iran	0.3	0.4
Japan	2.3	2.7

Source: FAO "Fertilizer Yearbook 1978"

(2) Production of potass is shown in Table 4-12.

Table 4-12 Production of Potassium

(Unit: 1,000 ton)

	1977	1978
USSR	8,347	8,900
Canada	6,082	6,123
E. Germany	3,229	3,270
W. Germany	2,341	2,470
USA	2,231	2,269
France	1,580	1,795
Israel	707	691
Spain	563	615
Italy	151	139
England	81	150
Congo	81	--
Total	25,393	26,422

Source: Phosphorus and Potassium Feb. 1979

Table 4-13 shows the import volumes of major importing countries. The figures in the table indicate combined import volume of potass and processed potassium fertilizer products since U.N. statistics do not clearly separate rock and processed goods.

Table 4-13 Potassium Imported by Major Countries

(Unit: 1,000 ton)

	1976/77	1977/78
China	105	177
India	278	599
Iran	3	3
Japan	700	702

Source: U.N. "Fertilizer Yearbook 1978"

An import breakdown by exporting countries is now not available. Potassium fertilizer shipments are small compared with other fertilizers. So far, no noticeable change has been seen in the import volumes of individual importing countries.

(3) Nitrogen-type fertilizers are currently in oversupply the world over. This situation is expected to intensify from now on. A chief cause of the surplus is that major consuming countries, which had been importers, have now been raising their self-sufficiency rates for such fertilizers. This trend is considered to continue. Table 4-14 shows the trends of production and consumption of nitrogen-type fertilizers in some of the countries east of the Suez Canal, namely India, China, Iran Iraq, Pakistan and Bangladesh. It is clear that each of these countries has been rapidly expanding its self-sufficiency rate.