THE PETROLEUM SHIPPING INDUSTRY

VOLUME I

A Nontechnical Overview

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ACKNOWLEDGMENTS

The writing of these books started more than 25 years ago as an idea for a doctoral dissertation. During my first three years in the shipping industry as a research economist for Zapata Naess, and another 23 years with Poten & Partners, I unfailingly compiled data and made notes of my experiences and observations. *The Petroleum Shipping Industry, Volumes I and II* are a culmination of this effort.

The first volume is directed toward the *hardware* of the industry: the ships, their characteristics, and trades. The second is concerned with the *software*: shipbrokerage, operations, international regulations, charters, and financing. This division enables the reader to select which aspect of shipping is of greater interest. The intent of both volumes, however, is to provide one with a complete overview of tankers together with the key issues affecting this vital industry.

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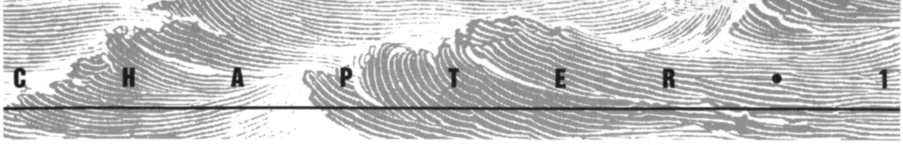

OIL: AN INTRODUCTION TO SHIPPING

Oil logistics drive the tanker business. Tanker demand depends on where oil products are consumed and where crude is found and refined. Prospects for tankers hinge on changes to the future pattern of oil logistics. Oil itself is not an absolute, but a derivative of overall economic activity and the role of energy in modern society. Oil must compete with other fossil fuels (coal and natural gas), plus nuclear and hydro power.

In the early 1970s oil was cheap, plentiful, and readily available. Oil exporters were earning less than $2 per barrel on their oil reserves while oil importers collected $5 per barrel in taxes, on average for the Organization for Economic Co-operation and Development (OECD) nations. Governments of oil importing nations were receiving far more in revenue than governments of oil exporting nations. This economic anomaly was one of the reasons for the formation of the Organization of Petroleum Exporting Countries (OPEC) in 1960. But it was not until October 1973 that OPEC

slate of products close to petroleum, is 20 gallons per ton. A good yield is 40 gallons per ton. Potential oil shale reserves may be far greater than conventional crude oil reserves, but high-grade, easily-mined oil shale reserves are estimated to be about one-half of world oil reserves. Although there are a few oil shale plants in operation, large scale commercial development of oil shale requires much higher oil prices to cover operating and capital costs.

The richest oil shales in the United States are found in the Green River formation in Colorado, Utah, and Wyoming. One ton of oil shale produces 20 to 25 gallons of oil; but some of this output has to be consumed to mine, crush, and heat shale to 900 degrees Fahrenheit in order to separate kerogen from the rock. In addition, a large amount of water is needed to process oil shale and, unfortunately, these states are short on water. There is also the daunting problem of disposing spent oil shale, whose volume is greater than unprocessed shale.

Another large source of oil is tar sand, which is bitumen, a tar-like substance mixed in sand. Huge tar sand deposits are located in Colombia, Canada (Alberta), Trinidad, and the United States (Utah, Alabama, California). Alberta tar sand deposits are estimated to be 1.7 trillion barrels of oil.[9] Synthetic crude produced from Athabasca tar sand deposits, located on the surface of the ground in Alberta, accounts for about 15 percent of Canadian oil production and is cost-competitive with exploring and developing new Canadian oil fields. Large reserves of bitumen are found in Venezuela. Orimulsion, an emulsion of bitumen (70%) with water (30%), is shipped in tankers and pumped directly into boilers at electricity generating plants in North America, Europe, and the Far East as a substitute for coal. Orimulsion and the Alberta tar sands are the only success stories in developing new sources of fossil fuels since the 1973 oil crisis; but their overall role in satisfying energy demand is minuscule.

SEVERING THE LINK BETWEEN ECONOMIC ACTIVITY AND ENERGY

Prior to 1973, there was a direct link between economic and energy growth. A five percent growth in economic activity was accompanied with a five percent growth in energy consumption. A direct relationship between

Nevertheless, whether strong or weak, Adam Smith's free market is to some degree subject to manipulation by its participants. There is precedent in the shipping industry for owners pooling their resources to avoid collective bankruptcy. A number of pooling arrangements have been devised among owners of forest products carriers, refrigerated vessels, and liquefied gas carriers to raise shipping rates by controlling the employment of the ships in the pool. These pooling arrangements were possible because, unlike tankers, there were relatively few operators who had to agree on the modus operandi of the pool and in the sharing of revenues or profits. But there is also precedent for a large grouping of owners to coordinate their actions in order to avoid the financial disaster of a depressed market.

In the nineteenth century, individual shipowners and shipping companies competed in Adam Smith's free and unfettered market to haul tea from India to Britain. Overbuilding resulted in ruinous price competition, which threatened the collective bankruptcy of all. The owners banded together to form the first conference, the Far East Freight Conference.

Today, the conference system handles much of the general and containerized cargoes among the world's trading nations. Rates are set at a level that supposedly covers costs and provides a modicum of profit, although competition within a conference and secret rate rebating have undermined the profitability, and the integrity, of various conferences from time to time.

There are major differences between the operation of tankers and container vessels. Container vessels usually sail under a published schedule between ports and are always partially loaded with containers. Tankers carry full cargoes and do not maintain a schedule of sailings. Container vessels can be better compared to the operation of an airline than to tankers. It is somewhat amazing that the world of shipping is made up of two distinctly different rate-setting mechanisms — one, unfettered and free, and the other administered by conference members sitting around a table.

WORLDSCALE RATES

The free and unfettered market quotes freight rates in terms of Worldscale rates, which provides advantages to both charterers and owners.

Table 4.4
Voyage distance and tanker demand

	SOUTH AMERICA	AFRICA	MIDDLE EAST
One way voyage distance (miles):	2,000	4,000	10,000
Days at sea:	11	22	56
Days in port:	3	3	3
Voyage days:	14	25	59
Number trips in 350 days:	25	14	6
Tons per year at 50,000 tons per voyage:	1.2 MM	0.7 MM	0.3 MM
Equivalent BPD:	24,000	14,000	6,000

The conversion factor for barrels per day to tons per year can be obtained by multiplying tons per year by 7 barrels per ton and dividing by 365 days per year. An approximate conversion factor for transforming tons per year to barrels per day is simply multiplying by 0.02; or conversely, multiplying barrels per day by 50 yields tons per year. Growth in tanker demand can be obtained by applying the equivalent BPD throughput per 50,000-ton tanker to the volume of imports from the three sources of oil.

Table 4.5
Number of vessels required

YEAR	SOUTH AMERICA	AFRICA	MIDDLE EAST	TOTAL
1	0	0	0	0
2	29	0	0	29
3	42	28	0	70
4	42	85	0	127
5	42	142	0	184
6	42	142	134	318
7	42	142	250	434

of this oil, . . . has to be replaced from the Persian Gulf, the additional tanker demand would be about 14 million DWT, or 6% of total world-wide tanker demand . . . . Inevitable continuing political uncertainty is likely to sustain the present high tanker freight market . . ."[9]

In the November issue, the 175,000 DWT freight index for October declined slightly to W315, the cause being "a subsequent reduction in Persian Gulf availability . . ."[10] In the December issue, the freight rate index for November dropped precipitously to W86 as a consequence of the Saudi Arabia embargo of oil exports to the United States and Netherlands in the latter part of October.

"The indications are that the present crisis of oil supply restrictions is likely to persist well in 1974, which will mean a growing surplus of tanker and a deepening depression in the tanker market . . . . When and if oil supplies return to normal levels, there will be a boom in tanker rates. How long this boom will last will depend on the extent to which oil stocks need to be replenished in the oil-importing areas. This, in turn, will depend on how long oil supply limitations persist."[11]

Table 4.11 shows that the order book by end-1973 had burgeoned even more.

Table 4.11
Increased fleet orders in 1973

	DECEMBER 1973	
DEADWEIGHT	# EXISTING	# ON ORDER
175,000-224,999	161	15
225,000-299,999	193	330
300,000+	12	180
Totals	366	525

A new world had begun for tanker owners. The restoration of supply was not to be the problem; it was instead the restoration of the growth in oil demand, which was about to take a decade hiatus. Meanwhile the fleet of VLCC/ULCCs was in the process of doubling in size. The Onassis era had ended.