MIDDLE EAST OIL AND WORLD OIL

By

SUHAYL NASIR

Thesis submitted in partial
fulfilment for the requirements
of the degree Master of Arts
in the Department of Arab Studies
of the American University of
Beirut. Beirut, Lebanon,
June 1957

MIDDLE EAST OIL AND WORLD OIL

SUHAYL NASIR

ABSTRACT

Hardly anywhere in the world today can we escape evidence of incessant activity in towns, cities and villages, on the highways and in the fields, on the sea and in the air. This stage of living is made possible only by a factor of vital importance to mankind. Oil without it, all this activity, which we often take for granted, would cease: or would be silent. Petroleum and its numerous by-products intrigue into practically every aspect of our modern economic setup.

The purpose of this thesis is to determine the relative importance of the role which Middle East oil is going to play in supplying the world's oil needs and to prove that the Western world, mainly Western Europe and somewhat the U.S., have no other alternative to this oil. This could be best achieved by (1) proving that technically or economically there are no available substitutes for oil; (2) measuring the tremendous growth that lies ahead for the world petroleum industry; (3) determining in broad terms the changing patterns of supply which will be necessary to satisfy the anticipated needs of the Western world and (4) finally by studying the comparative economic position of Middle East oil operations.

The world's output of crude oil has nearly trebled since 1938. In comparison, the rise of the Middle East oil industry, which recorded a tenfold expansion in the same period, has been little short of meteoric. Such a vast expansion within so short a period prompts a variety of questions. How has it been possible: Where are the supplies of oil located? Where has it been marketed? How has it been possible to ship and refine this huge increase of crude oil? The answers to these questions give a clue to the rising importance of Middle East oil to the non-communist world's consumption centers especially to Western Europe and to the United States.

The augmenting importance of the Middle East lies in the emergence of its huge potential during this period in which the demand for oil, especially in Western Europe, is increasing overwhelmingly fast, while, at the same time, consumption in the United States is running progressively further ahead of its production. From the early years in the history of oil production uhtil the aftermath of the Second World War, US oil output accounted for between 60 and 65 per cent of the world total. After the war, however, the United States became a net importer of oil, on a progressively increasing scale despite the increase of its production. Between 1947 and 1955, U.S. output increased by about 50 per cent. However, this rise lagged behind output in other areas, so that US share

dropped from 62 to 45 per cent of the world's total output, and did not catch up with American consumption, so that imports increased sixfold between 1947 and 1955.

The participation of the Middle East in supplying America's oil deficiency has been relatively small - though it has grown substantially in the last few years. The United States has been able to provide for its rising consumption by absorbing the bulk of the oil exports of Venezuela. The meteoric increase in the demand for oil in Western Europe thus had to be met from other sources, and preferably sources that did not involve huge outlays in dollars. The Middle East was the only available source; its output rose fourfold between 1947 and 1955, and it was able to provide Western Europe with the fuel it needed.

At present, Europe's dependence on Middle East oil is by no means as great as the figures of present trade suggest. Certainly the bulk, and the possibly the whole, of the Middle East supplies could be made good in an emergency by more intensive exploitation of fields in the United States abne, not to mention Venezuela. But this is the short view. In the next decade or two, Europe's oil imports are bound to increase very substantially, even if not at the extraordinary rate of the latest decade; whilst the oil balance of the United States seems almost certain to swing progressively further into the deficit. There are simply no other areas

in the world with such ample reserves and which could be relied upon for such a vast increase in production except in the Middle East. In determining the sources of supply adequate to meet the rising requirements of the non-Communist world, notably Western Europe and the United States, the Middle East becomes the balancing factor in equating world supply and demand and a large increase in the output of this sector is predicted during the next decade.

Any shift to other supplies could not be achieved without a heavy loss. The geological structure of the Middle East is unusually favorable to the formation of oil deposits in conditions that permit production on an exceptionally large and economical scale. For Europe, further, there is the consideration that a switch in its oil imports to the most obvious of the future alternative sources, Venezuela and perhaps Canada, would involve considerable dollar outlays. Europe can find substitutes for Middle East oil, but it cannot do so without appreciable additional cost. The extent of such a burden cannot exactly be estimated but it will be influenced mainly by the high costs in the United States. Moreover, the rate that reserves are increasing in the United States can hardly keep pace with the increase in consumption there, with the result that output is predicted to flatten out by 1965-75, calling for at least doubling the country's present volume of imports. These facts about the U.S. oil industry have led to an increase in unit costs which was met by a doubling of prices of U.S. crude since 1946.

The pricing of oil is determined, by an unusually complex combination of forces. Because the world oil industry is controlled by few giant companies, the concept of a free competitive market is inapplicable. The open-market is almost insignificant in relation to the huge volume of intra-company shipments, and sales under long term contracts between them. It is to the interest of each company, therefore, to produce in the cheapest market and sell in the most profitable market. After allowing for the increasec costs that are incurred by the oil companies operating in the Middle East, because of the large volume of ancillary costs and the high royalty payments under the recent 50-50 profit sharing agreements, it seems that the true price advantage in favor of Middle East crude is much larger than its market quotations. This explains why the U.S. has restricted oil imports from the Middle East. If Middle East output is reduced, Europe will have no alternative but to pay for imports from the United States at the high marginal cost of production there.

All these factors point out to the relative importance of Middle East oil to the Western World, as a potential and a cheap source of supply. Consequently, these facts lead to the inevitable conclusion, and that is in the coming decades, the Western World has no other alternative source of supply than the Middle East. The West drawing 20 per cent of its oil from the Middle East and hoping to raise that proportion to 50 per

cent in the next twenty years, has much to lose from the breakdown of economic relations.

Finally, this study should be regarded as a preliminary attempt to explore the aspects of a large and complicated field, about which the necessary data are not readily available or accessible and in many cases do not exist. It is more in the nature of an illuminary report about facts and figures about the Middle East oil industry which, it is hoped, will stimulate further investigation.

TABLE OF CONTENTS

CHAPTER ONE

OIL AND WORLD ECONOMY

If the 19th century was the age of coal, the twentieth century is the age of oil. In practically every aspect of life, behind every political move, in front of every business venture, there is oil. Oil in this century has become an indispensible element in our living. From the simple kerosene lamp up to the most complicated machine, oil is the cause of their utility. Almost everything in our twentieth century civilization is either directly or indirectly dependent upon oil or upon one of its by-products. Oil has almost become as necessary to modern civilization as air to human life. Just imagine what would happen to the world, if oil, by one force or another, should suddehly disappear. Our great towns and cities will be as silent and dead as the sands of the Great Sahara. Had it not been for the kerosene from oil, the country side in almost all parts of the world will be in darkness. Had it not been for the power derived from oil, the mighty machines in the factories will lay idle. Had it not been for petroleum, no cars, no super-sonic planes, and comfortable expresses would run. Oil has become the essence of existence in the twentieth century. It is no surprise then, that nations are ready to resolt to war, in order to secure the flow of oil to their countries, because their very existence depend upon that.

Oil is an explosive material. Wherever it is found and wherever it goes it sets not only the wheels of industry in motion but also the spark to many troubles. "It usually means troubled lands and unquiet world."[1]

In the epoch of fifty years only, rivalry for oil possessions was one of the major causes for two world wars, and was about to cause a third one. Petroleum is essential to the nation's peace time welfare, and indispensable and vital to the nation's security. The experience of two world wars shows that victory would have been impossible without adequate petroleum supplies, readily, accessible. Petroleum has become an indispensable commodity to the progress and welfare of nations. The importance of oil is portrayed by its increasing contribution to the shifting of man's burden to the modern machines that are powered by oil and gas.

It is no wonder that nations fight bitterly and strive to assure themselves an adequate supply of oil. But what is the origin of all these life and death wars? Is it because of the uneven distribution of oil supplies in the world? Is it the fear that oil supply and oil routes might be cut off one day and bring to a disastrous position the nations whose economies depend on that oil? Is there a famine of oil? How is this oil owned and controlled? How is its distribution arranged?

All these questions are lively matters, and their solution will be an important factor in determining the shape of inter-

---

1. Michael Brooks, Oil and Foreign Policy, (Lawrence and Wishart, London, 1949) p. 1.

national relations in the nearby future. Just, to what extent is Middle Eastern oil important in affecting the world's oil position, is the attempt of this dissertation. This Middle Eastern oil, has brought an important factor to the role of politics in this disturbed and troubled area. This factor has not only affected the Middle East itself, but has far greater and perhaps more important implications on the international scene. The coming events are going to decide the future of this factor, the oil of the Middle East, more specifically, Arabian Middle East. Who is going to ride the horse? Will the Middle Eastern countries ride the horse, and then, will they be able to handle the job, or will the rider remain unchanged? Why are all the powers so desperate about our oil?

These are some more questions, and more questions could be asked about the Middle Eastern oil situation.

I. The Role of Oil in World Economy

Oil is not wanted for its own sake but for the uses with which it provides us. Therefore, "every barrel of oil brought to the surface must be used as effectively as possible."[1] Practically, every particle obtained from oil is utilized and nothing is allowed to go to waste, and as science advances, new uses are being found and will be found.

A. Oil as a Source of a Large Number of by-products

Although we are prone to think of petroleum largely in terms of gasoline and diesel fuel for internal combustion engines

---

1. Kirley F. Mather, "The Availability of Petroleum Today and Tomorrow", World Geography of Petroleum, Wallace Pratt, ed. (American Geographical Society, 1950) p. 338.

and of fuel for heating our homes and operating steam engines, the fact is that many other products are derived from oil. It is from oil that the following products are derived: high octane spirit, gasoline, diesel oil, white spirit, vaporising oil, lubricants, fuel oil, coal tar, asphalt, petroleum coke, the gaseous hydrocarbons like methane, ethane, propane and hundreds of other products. Each of these substances has its own importance and its own use or even variety of uses. Each product of oil contributes to the prosperity of every nation's economy in the world.

B. Oil as Raw Materials

Many of oil's by-products are used as raw materials in the manufacture of new articles.

Paraffin wax is used in making candles, matches, water proof and grease proof paper, pharmaceutical operations, etc. Lubricating oils and inorganic soaps are the principal raw materials of the grease-maker. Paraffin, a by-product removed from lubricating oil by low temperatures or solvent action or filtration, is another industry by itself. The etcher preparing his plates for printing, the dentist taking the impression for an inlay, the pathologist preparing a thin section for examination, the manufacturers of candy, candles, butter cartons and papers, all use paraffin.

Petroleum sludges are raw materials for a number of chemicals, especially the sulphonates.

White oils, which are highly purified grades of lubricating oils, are used in the making of ointments, scents and cosmetics,

hair oil, flaked soaps, and as disinfectants. They help preserve surgical instruments. They are also used in the manufacture of nail-varnish, embrocations and lotions, as anti-freeze and de-icing mixtures, brake fluids and cutting oils, colored inks, floor and motor car polish, flaked soap, and in the preservation of oranges and eggs. In bakeries they help prevent bread from sticking to rolling slabs.

Petroleum waxes are the basis for waterproof paper, ice-cream tubs and milk containers. It is used for making candles and polishes of all kinds; as a depilatory, for the treatment of rheumatics, and for coating cartoons.

Carbolic acid type of organic chemicals are derived from processing cracked petrols.

Cracked products, both liquid and gaseous, are made to yield many different varieties of resins and plastic materials and many moulded articles such as fountain pens and telephones which are made from it. Several kinds of synthetic rubbers are also manufactured from this source.

Petroleum gases are used for several purposes. Ethylene, a cracked hydrocarbon gas, is both a source of alcohol and an anesthetic. Also, an anti-freeze compound is made with it.

Other cracked gas fractions are a prolific source of higher alcohols, ethers and ketones, which find many uses as solvents in chemical industry, such as in the manufacture of artificial silk and explosives. They are also a cheap source of glycerine.

From natural gas, useful substances such as chloroform and fire extinguishing fluids are produced. Natural gas is used for heating purposes and has double heating value to coal and is much cheaper.

C. Oil As a Source of Fuel

One of oil's uses that is rapidly growing is its application as fuel, which is competing to a greater degree with coal and replacing it, especially in the heavy industries which use coal as a fuel. This marked increase in the demand for fuel oil testifies to the favorable competitive position which it enjoys especially in selected industrial uses. The most significant characteristic of oil demand is the predominance of black oils over other oil products. Outside the United States, heavy fuel oils have recorded much swifter growth than gasoline. Broadly, the increase in the relative importance of black oils outside the U.S. since before World War II may be attributed to two factors. Most significant has been the six-fold rise in Western Europe's requirements of heavy fuel. The enormous increase in demand has sprung directly from the post-war inadequacy of coal supplies at a time of rapidly rising industrial energy requirements. Another factor contributing to the ascendancy of black oils is the expanding role of the underdeveloped regions in the overall pattern of oil consumption outside the U.S. The strength of fuel oil demand in the under-developed regions will be strongly supported by the long periods of industrial development which lie ahead.

As the world is becoming more and more industrialized or say mechanized, the demand for fuel oils is rapidly

TABLE 1

FREE WORLD CONSUMPTION OF FUEL OILS (a)

(Million Metric Tons)

	1938	1951	1952	1953	% increase 1938-53	1954	1955	% increase 1954-1955
U.S.A.	38.8	73.5	73.6	74.6	92	63.0	66.8	6
Canada	0.9	3.7	5.0	4.9	444	5.2	5.5	6
Western Europe (b)	3.6	18.4	19.3	21.0	483	26.7	32.8	23
Australasia	0.2	0.8	0.6	0.6	200	0.8	1.1	38
Total Developed Areas	43.5	96.4	98.5	101.1	132	100.7	110.5	19
% of all products (c)	26.0	24.9	24.1	23.5	-	32.1(d)	33.3(d)	-
Africa and Middle East	0.3	4.0	3.8	3.9	1,200	4.9	5.7	16
India, Pakistan, Burma & Ceylon	0.3	1.4	1.3	1.3	333	1.4	1.4	0
Rest of Asia	1.4	3.2	3.6	5.7	307	1.7	2.0	18
Caribbean & S. America	6.8	17.3	18.4	18.2	168	18.6	20.8	12
Total Underdeveloped Areas	8.8	25.9	27.1	29.1	231	26.6	29.9	12
% of all products	40.4	43.0	41.3	40.6	-	37.5	36.6	-
Total World excl. U.S.A.	13.5	48.8	52.0	55.6	311	96.3	109.6	14
% of all products excl.USA	24.0	35.2	34.1	33.5	-	n.a	n.a	-
Total World	52.3	122.3	125.6	130.2	149	168.6	186.6	11
% of all products, World	28.4	27.7	26.4	25.9	-	28.8	29.0	-

Source: Petroleum Press Service, Vol. XXI,No. 11, p. 412, Nov. 1954, for the years 1938-53, and Vol.XXIII, No.8, p. 292, Aug. 1956, for the years 1954-55.

(a) Excluding refinery consumption.
(b) O.E.E.C. countries plus Finland, Spain, Malta, Gibraltar and Yugoslavia.
(c) Figures for 1938-53 do not include Japan, while those of 1954 and 1955 do include it.
(d) Does not include U.S.A. whose % share of total products are 18.4, 18.0 for 1954 and 1955 respectively.

As the world is becoming more and more industrialized or say mechanized, the demand for fuel oils is rapidly increasing. "Estimates of the free world's consumption of petroleum products in 1955 confirm with unmistakable clarity that for the free world, outside the U.S., we are indeed in the new fuel oils era."[1] The focus of expansion in fuel oil consumption lies in Western Europe whereby the increase in fuel oil consumption has risen from 3.6 million tons in 1938 to 21 million metric tons in 1952 or an increase of 483% and from 26.7 million metric tons in 1954 to 32.8 million metric tons in 1955 or an increase of 23 per cent over 1954 which is comparatively high. Fortunately, the crude which Western Europe's refineries import from the Midd le East contains a high fuel oil residual.

The growth of demand for fuel oils in recent years has been remarkable, and is likely to continue to grow at even a faster rate in the near future, especially in the industrialized countries of Western Europe, because, as we are going to see later, of the unlikelihood, that coal will be able to meet the future fuel requirements of industry.

D. Oil as a Source of Energy

Mechanical energy is a multiplier of human energy. Unaided by tools man can hardly survive on this planet. With hand tools only, life for the many is a hard struggle, affording

---

1. Petroleum Press Service, "In the Fuel Oils Era", Vol. XXIII, No. 8, p. 291, August 1956.

little but the barest comforts. The widespread use of energy in production is one of the outstanding features of our epoch. The world as a whole needs more goods. This can be done by much greater application of mechanical energy. "For well-known reasons the use of oil has advanced more rapidly than that of coal or water power."[1] In the U.S. where 6% of the world's population uses over half the world's energy, oil supplied 40% of the country's needs in 1950.[2] At present, oil supplies it with something over 65% of its total energy needs.[3] To overcome poverty and improve the low standards of living of more than 2/3 of the people of the world is the most crucial and perhaps the most fundamental problem facing mankind. Of the three main forms of energy, oil offers a number of advantages even where there are potentially valuable coal deposits or water resources.

Whereas in 1938, oil provided 24%, and natural gas 7 per cent, of the world's commercially available energy requirements, today oil and natural gas together supply well over half. In the Eastern Hemisphere, where coal is still pre-dominant as a source of energy, (exclusive of Russia) it is estimated that about 21 per cent of total energy needs is met by petroleum in one way or another.[4]

---

1. P.P.S. "Energy in Society" Vol. XVII, No. 7, p. 178, July 1950.

2. Ibid.

3. Brewster B. Jennings, Economic Aspects of Middle Eastern Oil (mimeographed). A Paper delivered at Third Eastern Regional Conference, Sponsored by the New York Society of Security Analysis, Inc. Jan. 28, 1954.

4. Ibid.

Western Europe, taken as a whole, relies predominantly on coal for most of its industrial energy needs, but is faced with the prospect that coal production may not be expandible in the future to keep pace with rising demand for energy supplies. A recent study by a commission of experts by the O.E.E.C. organization shows that "provided prosperity and full employment continue", Western Europe's inland consumption of primary energy (expressed in terms of hard coal equivalent) will rise from 730 million metric tons in 1955 to about 840 million tons in 1960 and 1,200 million tons in 1975. The average annual increase in demand will be about 2½ per cent (compound) over the next 20 years.[1] "With present trends in coal production, and atomic energy still a distant contributor, the oil industry will inevitably be called upon to make the most important contribution towards meeting these rising requirements."[2] Thus oil is providing an increasing share in the world's increasing energy requirements.

Though much is said about the role of atomic energy, yet that source, is yet at a stage that would not compete at any degree with oil as a source of energy in relation to costs and time span. Even with the application of atomic energy to industrial purposes, the demand for oil, as we shall see later, will not decline.

---

1. P.P.S., "Assessment of Europe's Energy Needs", vol. XXIII, No. 7, p. 255, July 1956.
2. Ibid.

"Under any conditions oil supplies in increasing quantities are indispensable in any society seeking to progress".[1] Modern transportation and mechanized industry demand oil, and no country with industrial ambitions can hope to realize them without it.

According to a paper prepared by Dr. Robert E. Wilson Chairman of Standard Oil Company, Indiana, energy requirements of the world, will increase tenfold within the next century.[2] Petroleum will have a much larger share in meeting the world's increasing energy requirements. The growth of energy demand is currently so great, and is increasing at such a rate, that the major question is who will supply the demand, and will all countries together be able to supply it?

---

1. P.P.S., "Energy in Society", No. 7, p. 291, July, 1950.

2. Tom Dougherty, "World Energy Requirements Studied at Denver Conference", World Petroleum, Vol. 28, No. 1, p. 43, January 1957.

CHAPTER TWO

ALTERNATIVES TO OIL I

Oil is after all an exhaustible natural resource. At the same time it is not the only source of energy in the world. As a matter of fact, oil is meeting competition from other sources, such as atomic energy, coal, and synthetic oil. What does the world have as a substitute in case oil is cut off? To what degree can the world depend upon such alternatives for oil, and to what extent could these replace oil? In other words, can the world rely upon such substitutes, and what are the prospects of developing these resources, and could they really compete with oil as a source of energy?

I. The Case for Coal

Coal has been the classical or the principal source of energy. As a matter of fact, had it not been for coal, there is doubt whether the industrial revolution could have taken place. The world still relies heavily on coal as a source of energy. Interest in coal as a substitute for oil has been revived by the recent events in the Middle East. The case for coal as an alternative for oil is based on two criteria; firstly the adequacy of coal supplies, and secondly its competitive status with oil. If these two criteria are fulfilled, then coal is welcomed as an alternative for oil.

TABLE 2.

WORLD RESERVES AND PRODUCTION OF HARD COAL AND LIGNITE

(Million Metric Tons)

	Reserves Recoverable of Present Costs	% of World's Present Reserves	Production 1955 Hard Coal	Lignite	% Production 1955 Hard Coal	Lignite
North America						
U.S.A.	228,000	36	443	2	28	0.4
Canada	11,200	2	11	2	0.7	0.4
S. & Central America	12,960	2	7	0	-	0
Europe						
W. Germany)	42,000	7	131	90	8	18
E. Germany)			3	184	-	37
U.K.	21,500	3	225	0	14	0
Poland	10,000	2	95	7	6	1
Czechoslovakia	2,360	0.4	23	39	1	8
France	1,420	0.2	55	2	3	0.4
Portugal	1,280	0.2	-	-	-	-
Others	3,850	0.6	87	58	5	12
Africa	8,740	1.2	37	0	2	0
Asia						
U.S.S.R.	150,000	23	300	19	19	18
China	126,000	20	75(incl.Lignite)		5	0
Others	11,120	1.4	87	3	5	0.6
Australia	6,690	1	21	12	1	2.4
	637,120	100.0	1,601	489	100	100

Source: P.P.S. Vol. XXIII, No.9, p. 326, Sept. 1956.

A. Production and Reserves of Coal

With the eyes of the world fixed on the Suez Canal, it is opportune to consider whether coal might be called upon to a greater extent to help meet the rising energy requirements of the future. This raises the question, however, whether coal supplies and production warrant such a swift back to it.

Since 1913 up to 1955, that is over the span of 42 years, the world's production of hard coal has increased at a slow rate of 0.6 per cent per annum. Such an increase is a very small increase compared with a likewise six per cent increase of oil production. Everywhere in the world, except in the USSR and communist countries, production of coal has declined. United States' production has dropped by almost half since the end of the war, thus falling from 621 million tons in 1947 to 380 million tons in 1954. "In each case production figures were little different from those already attained 16 or 17 years earlier in the immediate pre-war period."[1]

As regarding reserves, it is a fact that recoverable resources of oil are much larger than already established reserves of oil. The world's proved recoverable resources of coal were estimated at around 840 billion metric tons of which 228 billion are in the United States, 82 billion in Europe, 150

---

1. P.P.S., "The Contribution of Coal", Vol. XXIII, No. 9, p. 323, September 1956.

billion in the USSR and 126 billion in China. (See Table 2). However, what is important in assessing world's coal reserves is the cost of their recovery. Total recoverable reserves would be 1,370 billion metric tons, and 2,500 billion tons at recovery costs of one and a half and four times present recovery costs.[1] Compared with oil reserves (150 billion tons), "the world's coal resources are about five or six times greater than its oil resources".[2]

However, one should not be dazzled by these huge estimates of coal reserves. Many of them lie in deep layers and are hardly accessible. Some are in isolated locations, which are far removed from the consuming markets. Here is what an eminent source commented on such optimistic figures about coal reserves.

"One conclusion should be crystal clear from this estimate of coal reserves...: Unless truly fantastic improvements in the state of arts are achieved, our descendants will have to pay far more for coal than the prices paid both in the past and at present. Large portions of coal reserves are of such poor quality, are located in such-out-of the way corners, are so unfavorable as to thickness of vein, depth, that only unheard-of-ingenuity or desperate need will render them available

---

1. U.S. Senate, Joint Committee On Atomic Energy, Peaceful Uses of Atomic Energy, Background Material For the Report of the Panel on the Impact of the Peaceful Uses of Atomic Energy, 84th Congress, 2nd Session, Vol. 2, January 1956, p. 17.

2. P.P.S. "The Contribution of Coal", Vol. XXIII, No. 9, p. 323, September 1956.

for use. In other words, they are not commercial reserves now, and they may never be."[1]

In other words, the world hasn't forgotten, the miseries and the tragedies of the coal mining industry, yet, nor it is willing to go back to the Nineteenth Century conditions. Moreover, the fact that coal resources exist is no guarantee that there will be a market for them or that they will be actually produced.[2] The coal mining industry is facing many obstacles which are making it harder for coal production to be increased. These problems are most pronounced in the Western World, especially Western Europe, where coal is mostly needed in case there is an emergency or a shortage of oil, especially in the light of Europe's mounting future energy requirements.

The primary obstacles facing the coal industry in the West is the labor problem. The wage bill accounts for over 60 per cent of coal production costs. "In an age of rising living standards, of full employment and of extending mechanization, the relatively dangerous and unpleasant occupation of coal-mining has little attraction".[3] The rise in wage bills will in fact add more to the estimated recovery cost of coal.

About 3/4 of the coal production of Western Europe, comes from U.K., and Western Germany. In both these countries

---

1. National Petroleum Council, Petroleum Productive Capacity, (Washington, 1952) p. 75.

2. P.P.S., op.cit., p. 324.

3. Ibid.

production is suffering from the problem of recruitment of sufficient numbers of workers and of the right type. A growing number of mine-workers are attracted to other industries now in prosperous condition where wages are often higher and where work is less hard and disagreeable. This has resulted in a lower output per manshift.

Another problem which is facing the coal industry is the rise in costs, as the mines are being depleted, and the higher wages the industry is being forced to pay, in order to keep its labor force. These factors have resulted in reducing the profitability of coal mining, and in the case of Britain have resulted in a net loss, which has, hitherto, reduced investment in this field, and hence output has declined.

In addition to high labor costs, the coal industry has often to incur high capital outlays, "a significant factor in an era of chronic capital scarcity."[1] This is very significant in Western Europe, and is exemplified in the case of U.K. when capital outlays of £1000 million over the next ten years will bring about only 20 million tons increase in output.

This labor problem is not present in the USSR and the Communist countries, for there, labor has no freedom of choice of movement between industries. This is why the USSR and its satellites were able to increase their output considerably.

Another major obstacle to the expansion of coal production is the loss of markets caused principally by the

---

1. Ibid.

competition from oil and natural gas. Competition from oil and natural gas, in the U.S. has reduced coal's contribution to total energy requirements from three quarters in 1920 to one quarter today.[1] In Western Europe, coal exports from the U.K., hitherto, Europe's major coal exporter, have virtually disappeared. From a total of 78 million tons in 1929, in UK's coal exports dropped to 53 million tons in 1937, 16 million tons in 1948, and virtually no exports were made in 1956.[2]

In concluding, one can safely say that, "the factors which held back coal production in the recent past, seems likely, in fact, to hold it back in the future."[3]

We see, therefore, that, in that part of the world, in Western Europe which depends mainly on coal, for its energy requirements, cannot continue to rely on that source of energy. Coal production in Western Europe is facing many difficulties. Already Europe is having a coal shortage and is relying on coal imports to meet its deficient output. Elsewhere in the world, any contemplated expansion of coal production has to face practically the same difficulties which Western Europe is facing in that respect.

B. Coal Versus Oil

The dependence of industry on oil as a source of fuel and energy is growing rapidly.

---

1. Ibid.
2. Ibid.
3. Ibid.

"More coal is not used because at prevailing prices many consumers find it cheaper or more convenient to use oil instead of coal."[1] Oil has a number of advantages over coal, which is fostering itsuse and hindering that of coal. "Oil has big advantages over coal both in its relative ease of production and handling and in its qualities in use."[2]

The most important field in which oil is competing with coal is in the Iron and Steel Industry. In deciding whether or not to convert to fuel oil, the relative prices and availabilities, the capital costs and the possibility of securing operating economies are the main factors.

One of the main advantages of fuel oil is that it has more calorific content than coal. Generally speaking, one ton of oil equals one and a half tons of coal in calorific content. Thus though, the price of coal is slightly lower than that of fuel oil, the differential is more than offset by the higher yield of fuel's oil calorific content, and on this basis only, a shift from coal to oil in industry is easily justifiable.

The capital costs of converting to oil have also to be considered. These are not very heavy, and recent experience in Western Europe, shows that industry is very adaptable from shifting from oil into coal usage and vice-versa. However, "in the light of price and capital cost factors, therefore, conversion to oil use is justifiable only where substantial

---

1. Petroleum Productive Capacity, op.cit., p. 75.
2. Ibid.

operating economies can be secured."[1]

In the steel industry, three main types of operating economies are obtainable by the use of fuel oil in open-hearth steel making. Because of special qualities that oil possess, the melting and refining time is reduced resulting in reduced labor requirements and savings in storage space.[2] A further technical advantage in the use of liquid fuels arises from generally better control of steel-making conditions because small adjustments can more readily be made to flame characteristics.[3]

Another operating economy obtainable from the use of fuel oil is that resulting from intergrating steel works. If there are suitable gas supplies in the near vicinities the adoption of this method is greatly justifiable. In fact, this is what happened in England. "The economies of converting to oil in this way depend, of course, in part on the price obtainable for gas, which is in many cases too low to make conversion economical."[4]

The use of fuel oil is not confined only to the steel industry, but is finding increasing outlets in other industries. Already in the U.K. an arrangement was made between Esso and the British Electric Authority whereby the latter's new power

---

1. P.P.S., Vol. XXI, U.K. Steel Industry's Oil Consumption", No. 9, p. 348, September 1954.
2. Ibid.
3. Ibid.
4. Ibid.

station (which was completed this year) at Marchwood, Hants, will be supplied from Esso's neighboring Fawley Refinery with from 350,000 to 600,000 tons of fuel oil a year, "at a price which will always result in operating costs no higher than if coal were used."[1]

In the more industrialized countries of Western Europe oil has not, in general, been seriously competitive with coal, which to some extent has enjoyed an assured market position. The main outlets for fuel oil have been found where it could offer some technical advantages in use, or where other reasons justified the buyer in paying a premium over coal prices. But taking into consideration the rising energy requirements for Western Europe, coupled with the inadequacy of coal supplies, the demand for fuel oil is already rising proportionately faster than that for coal. This case is not confined to Europe, but to all parts of the world. "The rising importance of oil as a source of energy is reflected in the fact that the free world's rate of output over the first six months of 1955 is equivalent in calorific value to rather more than 1,000 million tons of hard coal a year which is not short of the free world's actual production of hard coal which has varied between 1,100 and 1,200 million annually over the past half-century."[2]

---

1. P.P.S., "Oil and Coal", Vol. XXI, No. 8, p. 278, August 1954.

2. P.P.S., "Steeper Rise in World Production", Vol. XXII, No. 8, p. 275, August, 1955.

It is estimated that hard coal production in Western Europe will increase by about 1 per cent per annum up to 1965 and then it won't increase any more. Total production of hard coal which was in 1955 478 million tons will rise to about 520 million tons in 1965 annually. Net imports, mainly from the U.S. will constitute only 50 million tons. However, imports of coal are very expensive. "With freight rates rising, the landed prices of U.S. coal in Europe are not often twice the f.o.b. prices."[1] Moreover, there is the added disadvantage of importing American coal of payment in dollars. Also, this volume represents the maximum that could be imported from the U.S. in view of the present port and anchorage facilities. Lignite production will increase from 31 to at least 35 million tons a year, while hydro-electricity production may rise from 57 to 130 million tons a year. Nuclear power will play a negligible part and will amount to 40 million tons of coal equivalent in 1975. "By far the biggest increase in volume will be in respect of oil. "Inland consumption of petroleum products of 87 million tons in 1955 will probably reach 250 million tons (equivalent to about 365 million tons of coal) in 1975, with a growing proportion of fuel oil."[2] Oil's participation in energy consumption will

---

1. P.P.S., "U.S. Coal to Europe's Rescue", Vol. XXIII, No. 5, p. 180, May 1956.

2. P.P.S., "Assessment of Europe's Energy Needs" Vol. XXIII, No. 7, p. 256, July 1956.

rise from 17 to 30 per cent. "Indigenous oil and natural gas production together would represent in 1975, seventy million tons of coal equivalent, the increase being equivalent to about 52 million tons of hard coal a year, compared with an increase in coal and lignite production equivalent to only 46 million tons."[1] The Middle East will supply most of the oil imports.

"When one turns to the longer-term prospects, to confront the difficulties that are likely to be experienced in getting men to go underground to dig coal - the outlook for Western Europe's coal supplies is admittedly far from reassuring. It is conceivable that, in the long-term, inability to produce sufficient coal could become a real impediment to a continued rise in industrial production."[2] Therefore, coal has finally to give way to oil.

II. The Case for Atomic Energy

There is now a popular current discussion of atomic power replacing oil as a source of energy. Huge efforts are being made in speeding the progress of nuclear power. The Suez crisis has accelerated this interest. "The dramatic impact of political events in the Middle East has given renewed importance to the question as to what extent, and how soon, could atom power

---

1. Ibid.
2. P.P.S., "Oil and Coal", Vol. XXI, No. 8, p. 278, August 1954.

be called up to contribute to energy supplies".[1] Uranium mining is being stepped up and is extending to many new areas. Nuclear fuels are being produced at present in the U.S., the U.K., and the U.S.S.R. by a variety of methods, and the first atomic power centers are being or have been built in these countries. "New types of experimental pilot reactors are put to the test, and more are under construction and design".[2] Work on developing the use of atomic energy is being stepped up by the creation of the International Atomic Agency under the auspices of the United Nations, "and by the practical training now offered by the U.S. and the U.K."[3]

A. Economic Aspects of Atomic Enterprise

A small research breeder reactor was begun in 1951 by the U.S. Atomic Energy Commission, and a similar experimental reactor was started in the U.K. in 1954. The U.S.S.R. maintains that it has already a small atomic power station of 5,000 KW in operation. A much more larger plant with a much larger capacity is being built in Britain at Calder Hall, Cimberland, and is due to start operation in the early sixties. By next year, or the year after, the U.K.'s first large atomic power station of 60,000 KW will start operation.*

---

1. P.P.S., "Criteria of Competitive Atom Power," Vol. XXIII, No. 12, p. 448, December 1956.
2. P.P.S., "Atomic Enterprise", Vol. XXII, No. 1, p. 8, January 1955.
3. Ibid.

* It has been already started.

"neither of these large atomic pioneer stations will yet be economically competitive with oil-fired power stations, or even coal-fired power stations".[1] The American plan will have a capital cost of about $600 per installed KW, as compared with $120-150 per KW for non-atomic power stations, and the nuclear power's electricity has a unit cost of 3 cents per KW., as against 0.7 cents for ordinary electricity. In Britain atomic power reactors are said to produce electricity at 1 penny KWh, or about 50% higher than the average unitary costs for electricity produced by conventional power stations. It costs only £75,000 per ton of heavy water to be used in atomic power generators.

No definite conclusions have so far been drawn as to the most suitable and economic type of such reactors. A good many scientists and engineers, in fact, maintain that the costs of their construction and operation would in any circumstances be too great for neuclear energy to become a commercial proposition. The cost of a nuclear-fuel power plant is likely to be substantially in excess of that of coal burning plant of similar capacity. However, such a stage of development with more optimistic views could hardly be attained in less than 10 or 15 years.

As far as can be foreseen today, nuclear fuels will only be suitable "for some of the present applications of conventional fuels, and for few of those of oil."[2] Moreover, all

---

1. Ibid.

2. P.P.S., "Atomic Enterprise, Vol. XXII, No. 1, p. 11, January 1955.

development of atomic power projects are in the field of stationary power plants for electricity which account "for a very small fraction of total oil demand."[1] In the United States, current consumption of fuel oil by electric utilities amounts to less than 3% of the total domestic demand for petroleum.[2]

Besides high construction costs, the price of making atomic fuels for atomic power plants are also very high too. Making atomic fuels involves a "highly complex process of extracting from the ores the uranium metal that provides the basic source of nuclear energy, and the still more ingenious methods which have been evolved for enriching the puniary fuel and from producing from it a secondary artificial fuel of even greater potency. The enormously complicated operations of this unique industry require vast plants, immense capital investments, and very large resources of scientific and technical skill."[3]

Thus we see that atomic energy projects involve tremendous capital investment. The U.K. Minister of Works said in Parliamentary debate that: "splitting the atom is the most powerful and promising, but also the most dangerous and expensive of all discoveries."[4] Such huge expenditures on the development of atomic enterprise put a huge drain on public

---

1. Ibid.
2. "Peaceful Uses of Atomic Enterprise," op.cit., p.99.
3. P.P.S., "Making Atomic Fuels," Vol. XXI, No. 3, p. 95, March, 1954.
4. P.P.S., "Using Atomic Fuels," Vol. XXI, No. 4, p. 132, April, 1954.

funds. This will add a greater pressure on the economic difficulties which Britain is meeting. In comparison, this capital outlay on atomic energy development in Britain represents twice that which was committed in expanding the country's refining capacity.

B. Contribution of Atomic Energy to Total Energy Needs

It is, however, worth repeating that the tremendous effort now being made in Britain and many other countries to speed the advent of atomic power can bring about only a very gradual transformation of the energy scene, and even this will, in the foreseeable future, only affect the sector of electricity generation.* In assessing Europe's energy needs, "nuclear energy will only play a comparatively minor part in the coming two years."(1) In 1975, atomic energy will provide only 40 million tons of coal equivalent, out of total energy requirement of the equivalent 1,200 million tons. According to another estimate, "in 20-30 years' time, the output of nuclear power stations could conceivably be stepped up to a level equivalent to an electricity production that would otherwise involve the consumption of about 20 million tons of coal a year."(2) It is hoped that "with the use of fast breeding reactors it might be possible to meet the world's total requirements of electricity in the year 2000."(3)

---

1. P.P.S., "Assessment of Europe's Energy Needs", Vol. XXIII, No. 7, p. 256, July 1956.

2. P.P.S., op. cit., April 1954, p. 137.

3. P.P.S., "Revelation and Promise," Vol. XXII, No. 9, p. 314, September 1955.

* There is also the possibility of atomic propulsion in ships, but so far development has been confined to military operations.

In the oil industry, the advent of nuclear energy may have only insignificant effects. The possible displacement of oil in electricity generation is of minor significance in the world as a whole.

TABLE III

ESTIMATED CAPACITY OF NUCLEAR POWER STATIONS
(Millions of Kilowats)

	1965	1975
U.S.A.	Less than 4	20-25
U.K.	1.4-1.8	10-15
U.S.S.R. & Europe	?	10-25
Others	-	10-15
Total	Less than 10	50-100

SOURCE: A Paper "The Outlook For Atomic Energy". by C.M. Nicholls delivered in a meeting of the Institute of Petroleum.

T Today, oil used in power stations represents less than 9 percent of total fuel oil sales in Western Europe, and less than 6 1/2 per cent in the U.S., which is equivalent to 2 1/2-3 per cent of total domestic demand for petroleum products in both these areas.(1)

Instead of atomic power replacing petroleum in the near future, economists of Jersey Standard believe that the development of atomic power will actually increase consumption of petroleum products. The large scale of industrialization which

---

1. P.P.S., "Hastening Atomic Power", Vol. XXII, No. 12, p. 433, December 1955.

will result from employment of nuclear fission as a source of energy will mean a greater use of machines and e quipment which depend on oil for their power. Also, even 20 years from now, in 1975, the atom will still account for only a small part of greatly expanded amount of total energy consumed. Oil will still continue to dominate on the economic international scene, as the most available source of energy. There is no fear that atomic energy will replace oil in the near future, and the demand for oil will still be expanding at an increasing rate.

III. Prospects for Coal and Atomic Energy

It is clear from what preceded in our study about coal and atomic energy as alternatives to oil, that petroleum will play in the future an ever increasing role in supplying the world's needs of energy. It is estimated that the free world's total requirements of commercial forms of energy over the coming 20 years will increase at 3 per cent a year. In Western Europe, where about quarter of world's energy is consumed, the demand for energy will increase at 2 1/2 per cent to reach 1.250 million tons of coal equivalent in 1975. Little increase in West European coal production was foreseen to help meeting these increasing requirements, and at the same time coal imports from the U.S. are not likely to fill up the gap. "After taking into account prospective increases in supplies of hydro-power and of indigeneously produced natural gas, and also the appearance of a contribution from atomic energy, it was expected that oil demand in Western Europe would increase by an average of

5 1/2 per cent over the period as a whole - to reach perhaps 380 million tons coal equivalent in 1975."[1]

Estimates add up to a rate of 3 per cent increase in energy requirements for the whole world. But with many countries now starting economic development a big growth of commercial energy requirements and an increasing contribution from petroleum were foreseen. With coal increasing at a rate of 1 per cent, it is insufficient to meet these expanding requirements.

Atomic power is not expected to be of great importance in the coming 20 years. As for competition with oil, this is to be likely in a limited field, and that is electric generation. "It was predicted that if it expanded at the expense of oil then at most it would not cut prospective oil demand by more than 10 per cent below the more than doubled level expected to be attained in 1975."[2]

The future outlook is, therefore for oil. Oil is the source that will be called on to help meet the world's forthcoming energy requirements. "Petroleum will have its hands full in meeting the demands to be made upon it as the growth curve of energy requirements continues to mount. Oil need not fear inroads from atomic energy. Those areas in which atomics will make the first economic appearance will be those which oil can most profitably pull away from."[3] Both coal and atomic energy are not adequate alternatives for oil.

---

1. P.P.S., "Signposting the Future - I", Vol. XXIII, No. 7, p. 243, July 1956.
2. World Petroleum, op.cit., January, 1957, p. 43.
3. Ibid.

Oil has proved itself to be a unique resource. The world needs this oil, and the logical question is that can the world get it? In other words, wherein do the world's supplies of oil exist, and how far are they accessible? How important the r ole of the producing countries w ill be in affecting the future supply and demand of oil, or more specifically, how important is the role of the Middle East, is going to be in providing for the world's increasing consumption of oil, since it contains 76 per cent of the world's future reserves of crude?

CHAPTER THREE

ALTERNATIVES TO OIL II

I. The Case For Synthetics

For many years past, the potentialities of producing liquid fuels from coal or shale have been the subject of keen scrutiny, especially in the United States. This is one of the major efforts to provide substitutes for petroleum or petroleum products that are considered as supplemental reserves.[1] The main factors behind such a move are the following:

1. Oil is the prime essential of modern warfare
2. Discoveries of crude reserves in the U.S. have been slowing down
3. Foreign sources of crude, however, plentiful might not be readily available in the event of another war and,
4. Known reserves of oil shale and coal especially in the U.S. both far exceed known domestic reserves of petroleum.

"Accordingly, as a minimum safe program it would appear that at least enough research and development should be focused on each of these two alternative sources to establish more

---

1. Robert E. Wilson, "Oil From Coal and Shale", Our Oil Resources, edited by L. Fanning, McGraw-Hill Book Co., Inc., New York, 1945, p. 211.

definitely which is likely to be our principal reliance in case a crude shortage should become really imminent, and to demonstrate on at least a semi-commercial scale the more promising methods of making liquid fuels from whichever appears to be the most promising source."[1] In fact, the motive behind the establishment of synthetic methods has been either, the fear of an oil shortage in case of an emergency, as is the case in the United States, or the provision of an oil supply, in countries which possess no oil resources, but possess coal and oil shale deposits.

A. Historical Background

Production of oil by synthetic methods is not a modern development, but on the contrary, it dates back before the production of petroleum itself.

The history of oil shale and coal oil production goes back, in the United States, to the Revolutionary War, "When the oil shales and cannel coals of New York, Pennsylvania and other colonial states provided what little need then was for oil".[2] For the next few decades, oil from shale and coal helped meet the demand for oil then, which was mainly for lighting purposes. Colonel Drake's discovery of oil, marked

---

1. Ibid.

2. Cameron Russel, "Where Oil Shale Stands Today", World Petroleum, Vol. 27, No. 2, p. 58, Bebruary, 1956.

the end of coal and shale distillation for the production of oil, and till the present day, the industry has been long forgotten. However, in other parts of the world the industry took hold, and in Scotland, the synthetic oil production dates back to 1895, and in Germany, the first modern plant of synthetic oil production has been established before world war II.

The coming of the automobile aroused interest again in oil shale in the United States. The vast oil shale deposits in that country attracted a great deal of attention. The main motive was the fear of an oil shortage in the early twenties. "Numerous oil shale companies were formed and some plants were built, but unfortunately for the investors, the ventures were unsound, most from a technical standpoint and all financially. The few that were legitimate enterprises were driven into bankruptcy by the petroleum discoveries of the late twenties, and soon interest in oil shale was dormant once more."(1)

Except in Germany, Scotland, and Manchuria, synthetic oil production continued to be dormant until World War II. In The United States again, "the possibility that domestic petroleum resources might prove inadequate caused the government through its synthetic liquid fuels program to investigate coal, oil shale and other materials as supplements to petroleum."(2) The United States Bureau of Mines undertook the project and the government financed the whole work. Between 1944 and 1956, the government spent on synthetic research the sum of $87.6 millions.

---

1. Ibid.,

2. Ibid.

Since the end of the Second World War, an experimental oil mine and various pilot and demonstration plants have been established for a comprehensive investigation into the technical and economic aspects of oil-shale mining and processing of coal to oil conversion. Progress towars an oil shale industry in the United States made a significant step during 1955, with the announcement by the Union Oil Company of California of a $5 million development program leading to eventual commercial utilization of Colorado Oil Shale.(1) At the same time, the Department of Interior ended its research and development activities. It is time now, it is felt, for private enterprise to take over.

Elsewhere in the world, shale oil has been extracted continuously for many years. This activity has been started in most countries since the end of World War II. Brazil, Scotland, and Spain have launched ambitious programs to start synthetic oil plants using either oil shale or coal resources. The main purpose behind these projects is to save foreign exchange. But most of these projects, due to many contingent difficulties, have been scaled down considerably.

"In Spain the Government's ambitious plans for the establishment of large commercial plants for making synthetic fuels from indigenous oil shale and lignite have been scaled down considerably since they were conceived twelve years ago."(2)

---

1. Cameron Russel, op.cit., p. 59.

2. P.P.S., "Spain, Synthetic Fuels Hang Fire," Vol. XXIII, No. 10, p. 369, October, 1956.

The largest oil shale deposits in Europe are located in Estonia in the U.S.S.R., and the Soviet Union is said to be expanding this industry.

The most interesting experience of extracting oil from coal is the example offered by Sasol, a company established to extract oil from in South Africa. Sasol's original planned output was about 200,000 tons of all fuel products, which makes it the largest plant in the world for synthetic oil production. Its capital was planned at £ 18 million but rose to £ 40 million. Private enterprise did not participate in this venture, and its profitability is questionable although coal is available at sight. The project is financed by the government. Its returns are expected to be with the most hopeful estimates at 6-7 per cent while private enterprise needs at least, a 25 per cent return on such a risky venture. Sasol's experience, however, turned, as we shall see later, to be a sad experience in a pioneering effort to produce oil from coal.

In Asia, the largest oil shale plant is in Manchuria, where it had a pre-war level of 10,000 b/d. The Indian Government has made a scheme for such a plant of about 100,000 metric tons of annual output and requiring a capital investment of £ 16.5 million.

In Australia, where production was expanded during World War II, the plants have been abandoned. "Unfavorable mining coasts and obsolete process equipment lead to shales failure to survive."(1)

---

1. Cameron Russel, op.cit., p. 60.

TABLE 4

N.P.C. ESTIMATES FOR SYNTHETIC LIQUID FUELS PRODUCTION

	OIL SHALE			FISCHER-TROPSCH			COAL HYDROGENATION			
								Conventional		
	Single Plant	Industry	% of total Liquids	Single Plant	Single Plant	% of total Liquids	Modern Single Plant	Single Plant	Industry	% of total Liquids
Raw Materials (tons/day) Shale or Coal	76,800	384,000		7,040	17,200		11,690	12,960	112,500	
Products (b/d)										
Gasoline	25,380	126,900	63.1	8,710	21,380	79.2	19,490	19,490	163,830	75.8
Diesel Oil	12,200	62,360	31.0	-	-	-	-	-	-	-
Gas Oil	-	-	-	1,710	4,210	15.6	-	-	-	-
Liquid Gas	1,780	8,920	4.4	580	1,410	5.2	6,390	6,390	52,170	24.2
Residual Fuel	340	3,050	1.5	-	-	-	-	-	-	-
Liquid Chemicals	-	-	-	-	-	-	1,120	1,120	-	-
Total Yield of Liquid Products(b/d)	39,700	201,230	100.0	11,000	27,000	100.0	27,000	27,000	216,000	100.0
Steel Requirements (tons)	178,000	694,000		89,000	177,000		169,000	220,000	1,710,000	
Total Capital Needed (thousand dollars)	333,000	1,518,000		184,000	380,000		477,000	533,000	4,074,000	
Equivalent Capital Requirement per b/d of liquid products output (000$)	8.4	7.5		16.8	14.1		17.7	19.3	18.9	
Cost of Gasoline ($/US Gallon)	16.2	14.3		35.7	29.4		36.3	41.4	43.5	

Source: P.P.S. Vol. XX, No. 4, p. 142, April 1953.

B. Economic Prospects for Synthetic Oil Production

The economic prospects for synthetic production depend upon comparative costs between crude oil production and synthetic oil production. If synthetic oil could be produced at a cost which will result in a price competitive with that of crude oil then the venture is economically sound. However, costs depend upon the technical process used in producing synthetic oil, and for this purpose, costs will be discussed here relative to the various technological methods of obtaining oil from synthetic methods.

1. Oil from Coal

Much is more known about coal resources of the world than of oil shale. Coal can provide a substitute for oil first as a source of energy, and secondly as a source of oil. Oil could be extracted from coal by two methods. The first process is known as the hydrogenation process, and involves "treating powdered coal in an oil slurry with hydrogen under high pressure, in the presence of catalysts to make a heavy liquid which can be further hydrogenated under still higher pressures to make gasoline and other products."(1) This process was used extensively by the Germans during World War II for making aviation gasoline. "Very large investments and steel tonnage are required, and in its present state of development is believed to be considerably higher than the alternative Fischer process."(2) However, this process had the advantage of yielding a better quality of gasoline.

---

1. R. Wilson, op.cit., p. 222.

2. Ibid.

The other method of making synthetic fuels is the Fischer process and was also started in Germany. In this process, carbon monoxide and hydrogen (water gas) made from coke and steam are converted into gasoline and other petroleum products. In its primitive form, this process yielded an inferior quality of gasoline, but with catalytic-refining methods improved, this difficulty was overcome.

a. Coal Hydrogenation Process

The first factor in the coal hydrogenation method, is that not all types of coal are suitable for this process. The most suitable yet, quality of oil, in the light of the present known processes, is bituminous coal. The presently known U.S. reserves of subbituminous coal are believed to be about 800 billion tons, which would mean 850 billion barrels of gasoline, since one ton of coal would yield approximately one bbl. of gasoline.(1) According to early estimates one ton of bituminous coal would yield between 1 bbl - 2 bbls of gasoline, and some by-products.

Early estimates of cost of production have been placed at a range from 15.5 to 22.6 cents per gallon of gasoline (for 30,000 b/d plants and 3,000 b/d plants, respectively) at a coal price of $ 2.75 per ton.(2) However, this figure proved to be very optimistic, and in 1951, the U.S. Interior Secretary asked the National Petroleum Council to make a study about the prospects of extracting oil from coal and oil shales. In the

---

1. R.C. Heald, "Our Reserves of Coal and Shale", Our Oil Resources, p. 167.

2. Ibid., p. 168.

committee's report, the production of gasoline from coal hydrogenation would cost at least 41 cents per U.S. gallon, which compares with ex-refinery selling prices of gasoline from crude petroleum of 12.5 cents. Compared with prices of ordinary gasoline today (an average of 10-11 cents gallon ex-refinery f.o.b. prices) in the rest of the world, such a venture is still very costly. In a later study N.P.C. revised its figures, but the cost of oil from coal hydrogenation was still prohibitive, (35.7 cents per gallon of gasoline) and "the National Petroleum Council in the U.S.A. has reaffirmed its contention that there is no immediate prospect of obtaining synthetic liquid fuels from coal or shales at costs competitive with those of fuels produced from crude oil."(1)

Capital requirements for an installation of a high-pressure coal hydrogenation plant producing 27,000 b/d varies between $ 477 million for a modernized version single plant scheme and $ 533 million for a conventional version single plant scheme. As for a large scheme of 216,000 b/d capacity, the investment required is in the proximity of $ 4,074,000,000. This figure represents half the total expenditures of the oil industry in the whole world in 1955.(2) In calculating the cost of gasoline, the N.P.C. has allowed a 6 per cent return on the investment. "But the Committee has reiterated its

---

1. P.P.S., "Synthetic Fuel Costs Still Prohibitive", Vol. XX, No. 4, p. 141, April 1953.

2. J.E. Pogue and K.E. Hill, Future Growth and Financial Requirements of the World Petroleum Industry, Petroleum Dept., The Chase Manhattan Bank, (New York, 1956) p. 34, table 14.

doubts whether capital could be attracted to speculative ventures of this kind at that rate, citing the views of leading financial authorities that at least a return of 12-15 per cent on the total investment, would be required to provide a sufficient incentive to private enterprise.(1)

Another obstacle to the development of such a method is the steel shortage. Such plants require a great amount of steel of high quality. A coal hydrogenation plant requires between 196,000 to 1,710,000 tons of steel or somewhere between 10-13 tons per daily barrel of gasoline, while gasoline production from petroleum requires 0.7 to 2.0 tons of steel per daily barrel.(2) "Hence coal-hydrogenation plants require for the same gasoline output at least four times as much steel as petroleum refineries."(3) This fact, together with the fact that the demand for steel is greatly increasing for other purposes, puts another severe limitation on the building of coal-hydrogenation plants.

Another major obstacle to coal-hydrogenation development is the huge requirement of human resources. This is due to the need for more men to work in mining and extracting coal to bring about the increased amount of coal needed for coal hydrogenation. A British plant which produces 3,000 b/d of gasoline requires 6,000 men to run a coal hydrogenation plant. Compared with this figure, Aramco has 20,397 employees, but

---

1. P.P.S., op.cit., Vol. XX, No. 4, p. 143.
2. R.C. Heald, op.cit., p. 171.
3. Ibid.

has an average daily crude production of 965,041 barrels.(2) Moreover, petroleum plants are becoming more and more automized, and thus saving in their labor requirements. The labor problem puts another hindrance for coal hydrogenation development. The problem is to recruit enough people, when already there is full employment, in the countries where such a process will be mostly needed, especially in the United States and Western Europe. Moreover, the mining industry is already faced by the problem of recruitment, where workers are running away from such an unpleasant occupation. The employment of unskilled workers, would decrease per man output, because of their inferior efficiency. Henceforth, man-requirements for coal hydrogenation present acute problems for this industry.

b. Fischer-Tropsch Process

The Fischer-Tropsch process from coal is the most widespread today, for it is more economically feasible than the hydrogenation process. It involves two steps: (1) the gasification of any kind of coal or lignite and (2) the catalytic conversion of the synthesis gas to petroleum products. The advantage of this method over the previous method is that in this method any kind of coal could be used, whereas, in the process method only a special kind of coal could be used. "It is worth noting, however, that the amount of coal needed per volume unit of liquid fuels output is distinctly lower in hydrogenation than in Fischer-Tropsch, synthesis."(2)

---

1. Aramco, Report of Operations, 1955.

2. P.P.S., op.cit., Vol. XX, No. 4, p. 142.

The gasoline yield from this process, which is 79.2 per cent of total liquids, is higher than the gasoline yield from the coal hydrogenation process which is 75.8 per cent of total liquids. (See Table IV)

The industry on the whole suffers, but to a lesser degree, from the same drawbacks of the previous method, mainly steel and manpower requirements.

2. Oil Shale

"An oil shale is a shale containing little or no liquid oil or hydrocarbons that can be removed by ether, chloroform, or carbon tetra-chloride, but from which larger quantities of oil can be obtained by destructive distillation."(1)

Shale oil industries have long been in existence or in prospect in many countries of the world. There are plants in operation or planned already in Scotland, Sweden, Germany, France, Italy and Spain, in Estonia, Russia, and Manchuria, in Australia, South Africa, Canada, and Brazil. "None of those in existence is however, of more than local importance, and few have proved capable of paying their way."(2) One significant fact is that two countries in the world contain most of the world's shale deposits. These two countries are Brazil and the United States. Brazil has got shale deposits of the order of 300,000 million barrels, which is about 60

---

1. R.C. Heald, op.cit., p. 180.

2. P.P.S., "Venture into U.S. Shale," Vol. XXIV, No. 2, p. 58, February 1957.

times more than shale deposits in the rest of the world, excluding the U.S.[1] As for the United States, reserves of oil shale are estimated between 30-40 billion barrels.[2]

As for oil yields, shale deposits give a varied oil content depending upon the quality of shale. The oil yields per ton of shale vary from 15 to 70 U.S. gallons. Scottish shale-oil operations have long used shales with an oil yield of 22-24 gallon per ton.[3] Taking an average yield of 20 gallons per ton, and at production level of a million barrels per day the U.S. reserves would last for 80 years.[4]

Because of highly complicated mining processes involved, in order to enable conversion of shale to oil, "the economic competitiveness of shale oil with crude petroleum depends therefore largely on the technical efficiency and on mining costs."[5] The Bureau of Mines in its final report proved that mining costs could be scaled down to 50-60 cents per barrel as compared with an earlier estimate of mining costs between $.91 to $1.83.[6] However, taking an aggregate

---

1. Ibid.
2. World Petroleum, op.cit., Vol. 28, p.43, January 1957.
3. R.C. Heald, op.cit., p. 189.
4. World Petroleum, op.cit., Vol. 28, No. 1, January 1957.
5. P.P.S., op.cit., Vol. XXIV, No. 2, p. 59, February 1957.
6. P.P.S., op.cit., p.

cost for the whole process, though the cost per gallon is lower than in the previous two processes, yet it is still high to warrant any commercial production. Production costs of a minimum of 14.7 cents per U.S. gallon of gasoline are still higher than ex-refinery prices of 11-13 cents per U.S. gallon.

A private company is undertaking research for establishing the oil shale plant in the United States. The experts of this company, Union Oil Company of California, estimate that the capital investment involved will be initially between $3,000 to $5,000 per barrel for a plant of daily capacity of 20,000 b/d. Thus, such a plant will cost $60 million to $100 million and a 100,000 b/d installation over $300 million.(1) Though this figure is very optimistic compared with N.P.C.'s estimates, (see Table IV), it is still higher than the capital required for crude oil production and refining which range between $1,400 and $2,800 per barrel.(2) However, with rising cost of production in the U.S., the venture might become profitable, since the tendency of crude prices show an ascending one.

Shale oil's production suffers from the same handicaps of the previous two methods mainly, manpower, and steel requirements.

---

1. R.C. Heald, op.cit., p. 192.

2. Ibid.

TABLE V

APPROXIMATE MANPOWER REQUIREMENTS FOR SHALE MINING

Type of Production	Men Required
For production of 100,000 bbl. of crude shale Oil Daily:	1
From Shale assaying 20 gal. per ton	15,400
" " " 25 gal. per ton	12,400
" " " 45 gal. per ton	6,900
For production of 100,000 bbl. of gasoline Daily:	
From shale assaying 20 gal. per ton	25,600
" " " 25 gal. per ton	20,700
" " " 45 gal. per ton	11,500

SOURCE: Fanning, L., Our Oil Resources, p. 191.

Moreover, land values have risen sharply during the past ten years for oil shale bearing lands. Price of land has risen from as little as $10 per acre to $450 per acre of good land.

C. Conclusions About Synthetics

This ever-increasing interest in synthetics and providing substitutes for oil springs from one fear, and that is a fear of a sudden stoppage of present oil supplies to the consuming countries. It is an emergency device. This fear has sprung from two main causes: firstly, the increasing rate of petroleum consumption in the United States, and Western Europe, secondly, coupled with this, is that the U.S. crude oil pro-

duction and reserves, as we shall see later in Chapter VI, are not sufficient to meet the fast rate of increase in demand, and the U.S., since 1949, has become a net importer of oil. Moreover, interest in synthetics is being accelerated in countries which do not possess assured oil supplies, and which depend upon oil supplies that are vulnerable to being cut off at any moment, such as Western Europe.

These facts have instigated some countries to investigate into the possible production of oil by synthetic methods. Such a dream has been present always whenever there was a fear of an oil shortage. It was aroused in the twenties when there was the fear in the U.S. of an oil famine, but it soon was allowed to lapse into oblivion by the discoveries of oil in the late twenties. It has come into the scene recently, because there was the same menace to the flow of oil supplies to the Western World from the Middle East. As a matter of fact, because of the vulnerability of Middle Eastern oil supplies, and since the West has come to rely, especially Western Europe, on such supplies for meeting its home consumption, the question of synthetics and the provision of other alternatives to replace Middle Eastern oil in case of an emergency, and to lessen the degree of the West's dependence on our oil in order that the blow be less severe, if they were prepared for it, was fully discussed. "In a world over-shadowed again by the menace of new military conflicts on a global scale, the question of location of petroleum resources is of first importance. The area containing the most prolific reserves now known, the Middle East,

would become of the most exposed storm centres in the event of open hostilities. Yet, neither the expected vastness of the U.S.A.'s still unexploited oil reserves, nor the industry's ready adaptablity to new conditions, can provide the guarantee that output rates could be speedily raised to the levels that might be demanded by the necessities of another global war."(1) Recent events have testified to the validity of this prophecy. The Middle East, whether by chance, or by God's endowment, happens to contain more than three quarters of the world's reserves of oil, while in the rest of the free world, most of the countries which depend upon that oil possess no oil at all, or those that possess, are depleting their reserves at such a rapid rate, that sooner or later they will have to depend in their turn on Middle Eastern oil supplies.

However, whether unfortunately for the West, or luckily for the Middle East, the economic prospects for synthetics proved to be discouraging. The most promising prospect and that is shale oil conversion, is still beyond economic feasibility. Such plans are not even possible to execute in the United States where costs of crude production are the highest in the world. Moreover, if we compare cost figures of such prospects to costs of crude production in the Middle East, we can find out why the West has called Middle Eastern Oil as its "Lifeblood." If we compare only mining costs of shale oil to crude production costs in the Middle East, we can see the huge differential, that makes the West cling to Middle East Oil, at even the price of war rather than adopt such

---

1. P.P.S., "Case For Synthetics," Vol. XVII, No. 12, p. 345, December 1950.

expensive schemes for oil production. It was estimated that oil shale could be mined at a low cost of 50-60 cents a barrel, while the highest figure for Middle Eastern production, and that is that of Aramco, is 40 cents per barrel, while in fact oil is produced in the Middle East as cheap as 10 cents per barrel.(1) Moreover, capital requirements of an oil-shale industry are of the order $1,518 million, while all capital expenditures on Middle East production in the ten-year period between 1946-1955 accounted for only $1000 million.(2) This is to speak nothing about comparing the output from such a scheme and the output of only one area in the Middle East.

Let us not speak anymore about comparing the costs of such a scheme with costs in the Middle East, because I believe such a comparison is needless, since these schemes are beyond economic feasibility in countries which already have high production costs of crude oil. Let us see what has become of such schemes in countries which already attempted them. In South Africa, the largest synthetic project in the world, has so far been nothing but a sad experience. Due to technological difficulties, the plant was forced to shut down twice after a short run. At the time, when the plan was started, capital requirements were estimated at £ 18 million in 1951, but this figure has jumped to £ 40 million in 1955, and at least cash requirements will be increased by a further £ 8.5 million, because operation was due to start in 1954, but has not yet begun. This figure of capital cost of £ 40 million

---

1. S. Yari, "Marketing Middle East Oil", Middle Eastern Affairs, Vol. VII, Nos. 6, 7, June-July 1956, and private information.
2. P.P.S., "Oil Investment Dissected", Vol. XXIV, No. 2, p. 55, February 1957.

represents an investment of about £ 135 per ton of overall output and is equivalent to £ 180 per ton of liquid fuels production. "The capital expenditure per ton overall is three or four times that nowadays required for the whole range of oil industry operations from the searching for crude to the marketing of finished products."(1)

This ambitious but sad experience is not confined only to Sasol in South Africa, but elsewhere where synthetic production was attempted. In Australia, the plants were shut down because of obsolete equipment and technical difficulties. Spain's ambitious program was greatly scaled down from what was originally planned. In the U.S.S.R., where production is state-controlled, the production of synthetic gasoline from coal is regarded as six to seven times more expensive than gasoline from natural crude.(2)

What all this amounts to is that synthetic oil production is an unsound economic venture. "Up to now, however, it has invariably been found that in a country with ample and comparatively cheap natural oil resources (compared to synthetic costs) such as the United States, the production of synthetic oil, even by the most advanced techniques, could not under present conditions be considered an economic proposition by any normal standards of commercial accountancy".(3)

---

1. P.P.S., "Sasol in the Trials of Pioneering", Vol. XXIII, No. 2, p. 58, February 1956.

2. P.P.S., "USSR Plan Fulfillment Promised", Vol. XXVII, No. 7, p. 260, July 1955.

3. P.P.S., "What Price Synthetics?" Vol. XIX, No. 1, p. , January 1952.

It is true that synthetics provide rich and fresh reserves, but however many obstacles hinder the adoption of such processes. "Synthetic oil products can provide an important supplement or reserve, but very few countries have the natural resources and the capital necessary to establish a synthetic industry."(1) The United States might be able to provide the capital needed for synthetic oil industry, but Western Europe, especially England and France, certainly do not possess the financial requirements to carry out such a scheme. Moreover, private enterprise could not be attracted by such a risky and unprofitable venture, while at the same time the government treasuries, in most countries of Western Europe cannot bear any extra heavy financial burdens.

In most countries, where synthetic plants are in operation or planned, the government is the sole executor of such projects. They are either sponsored by the government or given protection and support by it. This is why they still exist despite their uneconomic character. Such projects are at least at the present, impossible to execute. Even with the "recovery of oil from shale being moved closer to substantial reality under present research and development work, that will seem plausible sometime between 1960 and 1965."(2)

---

1. H. Feis, "The Effect of the World Distribution of Petroleum on the Power and Policy of Nations," World Geography of Petroleum, op.cit., p. 394.

2. World Petroleum, op.cit., Vol. 28, No. 1, p. 43, January 1957.

It was estimated that a capital cost of $9,200 per b/d of oil production by 1965, and the comparable cost of oil from shale at $8,000 per b/d within 1960-65, and the daily cost of coal hydrogenation between $12,000-$16,000 per b/d.(1) Thus together with the fact that oil shale reserves are estimated at 30 million barrels supporting 1 million b/d industry for 80 years, shale oil might have a chance within the coming decade. But this figure was criticized at being too optimistic, and besides such an output is equivalent to that of California today, and with the rapidly increasing rate of oil consumption, such a figure, would meet but a fraction of total demand by that period. Moreover, "imported foreign oil, moving freely in international trade will tend to delay the advent of synthetic fuels."(2)

Such vast plants, with vast capital requirements could be undertaken only by government or supported by subsidies to permit production, since they cannot possibly compete on a commercial basis with products made from crude oil. Moreover, construction of such plants could be executed only if they were assured by the governments a market at higher prices. "The danger and fallacy of such proposals, in addition to their tremendous cost to the taxpayers, is that they would automatically interfere with the market for natural petroleum and act to reduce the economic incentives for the development of new crude oil. There is the real need for the government

---

1. Ibid.

2. Ibid.

to undertake these expenses on uneconomical projects when private capital is available to supply all the liquid fuels required."[1]

Why risk such large sums of capital when crude oil supplies exist abundantly in certain regions of the world, and at the same time cost far less than oil produced by synthetic methods? "Certainly one alternative to the use of high cost fuels is the peacetime exploitation of the vast resources of petroleum which exist outside the Western Hemisphere."[2] The risks which synthetic production will meet from competition from foreign sources, especially from cheap Middle East oil, are quite important and serious.

In summing up, all the facts point out to one single conclusion and that is synthetics have not got the chance to stand on their own feet. If oil synthetics are far from competing with oil produced from natural crude at high costs in the West and the U.S., what chance can such an industry have in competing with the relatively much cheaper crude of the Middle East? What all this amounts to is that the West cannot find any substitutes for oil. It has to continue to rely on oil, and at a very rapidly increasing rate. They do not have the oil. They cannot find substitutes for it. We have it. We have it rich, and we have it all.

---

1. Petroleum Productive Capacity, op.cit., p. 76.

2.

CHAPTER FOUR

THE ROLE OF MIDDLE EASTERN OIL IN WORLD SUPPLIES

Each country now intently wishes to have an assured prospect of enough oil at all times and for all uses. The nations will continue to do so unless and until new types of fuel displace oil. The world demands oil and will continue to demand it. But who will supply this oil and what factors will affect its flow? How has the demand for oil grown over the past decades and how was it provided for? In the previous chapters, we have seen, that the demand for oil is likely to increase in the nearby future, and to increase at a faster rate than hitherto. On the other hand, the prospects for finding alternative resources that would reduce the dependence on oil, are few and not hopeful. This oil, which every nation so badly needs, will they have a famine of it? Is there again a fear of oil shortage as that which existed in the twenties? These pages will try to reveal the fact of the growth of world petroleum production and consumption and what countries are the world's suppliers of oil, and what is the place of the Middle East regarding oil supplies.

I. World Oil Consumption

In a recent study about the growth of the oil industry prepared by the Petroleum Department of the Chase Manhattan Bank, it is shown that the consumption of oil in the United

States for the past 23 years has grown at a compound rate of 5.8 per cent annually, and that for the Free World has increased at a rate of 11 per cent compounded over the past 13 years. "These are dynamic trends."(1)

One of the main characteristics of our time is the increasing desire of more people for a higher standard of living. This has reflected itself in a continuous increase for more goods and services. "Increasingly, people are realizing the vistas opened up by the success of modern technology. And in the post war era, advancing technology married to a growing and more widespread appreciation of economic factors, has brought about a surge of production unprecedented in size."(2) This resulted in the construction of huge machines which depend mainly upon oil for their operation. Moreover, the conversion of most power machines from coal to oil has increased the rate of oil consumption. Most significant is the conversion of ships and trains from coal usage to oil usage. Another majorfactor for stemming oil consumption is the heavy rise in the use of oil for military purposes and requirements.

The consumption of oil, not only has risen absolutely, but, also, there has been a shift in demand for the various petroleum products. In the early times, petroleum was chiefly wanted for its kerosene by-products for lighting purposes. With the discovery of electricity, and the coming of the

---

1. J.E. Pogue, op.cit., p. 5.

2. PPS. "Vigorous Growth", Vol. XXIII, No.1, p. 1, January 1956.

automobile, the demand for kerosene has slackened, and gasoline replaced it as the most desired by-product from petroleum. With the coming of the diesel engines, diesel oil began to gain prominence. Fuel oil is becoming an important by-product, since most industries are preferring, the use of fuel to that of coal. With the advent of the petrochemical industry, numerous petroleum by-products are becoming more and more important. In few words, oil consumption is not only rising on a global figure, but there is also a rise in the demand for the various by-products from oil and a shift in their relative importance.

Since the world is in need of more and more energy, oil is likely to provide an increasing share. Since 1938, the free world's total consumption of energy has risen by about two-thirds, while oil consumption has risen more than twice as fast.(1) Consumption of petroleum products in the Free World has risen from about 185 million metric tons in 1938 to nearly 500 million tons in 1953, and to a high level of 798 million metric tons in 1955.(2) An important characteristic of oil consumption is that it very rarely falls, and, if it did, it was due only to incidental causes that had to do with the flow of oil supplies, as the recent

---

1. P.P.S., "The Buoyancy of Demand", Vol. XXI, No. 11, p. 401, November 1954.

2. For 1938, 1953, Ibid.; for 1955, P.P.S., "New Estimates of World Consumption", Vol. XXIII, No. 6, p. 244, June 1956.

experience in Western Europe. Such an expansion in oil consumption is "attributable to the indispensability of oil in almost every community once its use for any purpose has become established."(1) Oil consumption per se is a concomitant of any expansion of economic activity.

As petroleum's products are intriguing ever more deeply into the makeup of modern civilization, the rapid development, and the changing pattern of oil consumption beget an increasing importance. "The sheer size of the free world's oil demand, today more than six times its level in 1938 - is one of the important features of the modern economic scene."(2)

In the immediate postwar years the free world's total petroleum consumption rose steeply at an average annual rate, 1945-55, of between 8 1/2 and 9 per cent.(3) However, after 1951, consumption has slackened down to a rate of 6 per cent increase in 1951-52, 5 1/2 per cent 1952-53, and 5 per cent 1954.(4) This rate of two years ago was nearly the same as the long-turn average between 1925 and 1954; However, this period includes two exceptional incidents: the

---

1. P.P.S., op.cit., Vol. XXI, No. 11, p. 402.
2. Ibid., p. 411.
3. P.P.S., "Consumption Kaleidoscope", Vol. XXII, No. 8, p. 278, August 1955.
4. Ibid.

depression of the thirties and the Second World War.[1] The decline in the rate of consumption growth recently is due mainly to the end of the boom caused by the post-war reconstruction period. However, under the incentive of a world-wide economic expansion and development, concomitant with coal shortages in some countries, world oil consumption jumped in 1955 by 80 million tons or by 11 per cent.

One important feature of world consumption growth is that the trend is for the U.S. consumption to grow at a slower pace than in the rest of the free world. In 1954, the gain in U.S. consumption was only 1 1/2 per cent, while for the rest of the world, the rate was 11 per cent. This slower growth in U.S. demand has reduced its proportionate share of the free world's total inland consumption from 70.2 per cent in 1938 to 68.7 per cent in 1951, and to 64.5 per cent in 1954.[2] This was mainly due to the economic recession in the U.S. at that time, while high economic prosperity in the rest of the free world, worked to enlarge the differential in the rates of consumption growth. However, with sharp business recovery, U.S. consumption jumped by 8 per cent in 1955, and is believed to increase still further.

In contrast with the United States, consumption in under-developed regions is increasing at a fast rate. The share of these regions in the free world's total inland

---

1. Ibid.

2. Ibid.

TABLE 6

WORLD CRUDE OIL PRODUCTION, BY COUNTRIES, BY YEARS

World and North America, 1857 - 1895

(Thousand Barrels)

YEAR	World Total	Percent Produced by U. S.	Canada	United States	Total North America
1856	.....	.....	.....	.....	.....
1857	2	.....	.....	.....	.....
1858	4	.....	.....	.....	.....
1859	6	31	.....	2	2
1860	509	98	.....	500	500
1861	2,131	99	.....	2,114	2,114
1862	3,092	99	12	3,057	3,069
1863	2,763	94	83	2,611	2,694
1864	2,304	92	90	2,116	2,206
1865	2,716	92	110	2,498	2,608
1866	3,899	92	175	3,598	3,773
1867	3,709	90	190	3,347	3,537
1868	3,990	91	200	3,646	3,846
1869	4,696	90	220	4,215	4,435
1870	5,799	91	250	5,261	5,511
1871	5,730	91	270	5,205	5,475
1872	6,877	92	308	6,293	6,601
1873	10,838	91	365	9,894	10,259
1874	11,933	92	169	10,927	11,096
1875	9,977	88	220	8,788	9,008
1876	11,051	83	312	9,133	9,445
1877	15,754	85	312	13,350	13,662
1878	18,417	84	312	15,397	15,709
1879	23,601	84	575	19,914	20,489
1880	30,018	85	350	26,286	26,636
1881	31,993	86	275	27,661	27,936
1882	35,704	85	275	30,350	30,625
1883	30,255	78	250	23,450	23,700
1884	35,969	67	250	24,218	24,468
1885	26,765	59	250	21,859	22,109
1886	47,243	59	584	28,065	28,649
1887	47,807	59	526	28,283	28,809
1888	52,165	53	695	27,612	28,307
1889	61,507	57	705	35,164	35,869
1890	76,633	60	795	45,824	46,619
1891	91,100	60	755	54,293	55,048
1892	88,739	57	780	50,515	51,295
1893	92,038	53	798	48,431	49,229
1894	89,337	55	829	49,344	50,173
1895	103,692	51	726	52,892	53,618

Source: World Oil - International Outlook Issue,
Vol. 143, No. 3, August, 15, 1956.

WORLD AND NORTH AMERICA, 1896 TO NOW
(Thousand Barrels)

YEAR	WORLD TOTAL	Percent Produced By U. S.	NORTH AMERICA				
			Canada	Mexico	United States	Cuba	Total North America
1896	114,199	53	727	.....	60,960	....	61,687
1897	121,992	50	710	.....	60,476	....	61,186
1898	124,979	44	758	.....	55,364	....	56,122
1899	131,147	44	808	.....	57,071	....	57,879
1900	149,137	43	913	.....	63,621	....	64,534
1901	167,440	41	757	10	69,389	....	70,156
1902	181,809	49	531	40	88,767	....	89,338
1903	194,879	52	487	75	100,461	....	101,023
1904	217,948	54	553	126	117,081	....	117,760
1905	215,091	63	634	251	134,717	....	135,602
1906	213,263	59	569	502	126,494	....	127,565
1907	263,957	63	789	1,005	166,095	....	167,889
1908	285,287	63	528	3,933	178,527	....	182,988
1909	298,709	61	421	2,714	183,171	....	186,306
1910	327,763	64	316	3,634	209,557	....	213,507
1911	344,361	64	291	12,553	220,449	....	233,293
1912	352,443	63	243	16,558	222,935	....	239,736
1913	385,345	64	228	25,696	248,446	....	274,370
1914	407,544	65	215	26,235	265,763	....	292,213
1915	432,033	65	215	32,911	281,104	....	314,230
1916	457,500	66	198	40,546	300,767	....	341,511
1917	502,891	67	214	55,293	335,316	....	390,823
1918	503,515	71	305	68,828	355,928	....	420,061
1919	555,875	68	241	87,073	378,367	....	465,681
1920	688,884	64	196	157,069	442,929	....	600,194
1921	766,002	62	188	193,398	472,183	....	665,769
1922	858,898	65	179	182,278	557,531	....	739,988
1923	1,015,736	72	170	149,585	732,407	....	882,162
1924	1,014,318	70	161	139,678	713,940	....	853,779
1925	1,068,933	71	332	115,515	763,743	....	879,590
1926	1,096,823	70	364	90,421	770,874	....	861,659
1927	1,262,582	71	477	64,121	901,129	....	965,727
1928	1,324,774	68	624	50,151	901,474	....	952,249
1929	1,485,867	68	1,117	44,688	1,007,323	....	1,053,128
1930	1,410,037	64	1,522	39,530	898,011	....	939,063
1931	1,372,532	62	1,543	33,039	851,081	....	885,663
1932	1,309,677	60	1,044	32,805	785,159	....	819,008
1933	1,442,146	63	1,145	34,001	905,656	23	940,825
1934	1,522,288	60	1,417	38,172	908,065	28	947,682
1935	1,654,495	60	1,447	40,241	996,596	47	1,038,331
1936	1,791,546	61	1,500	41,028	1,099,687	62	1,142,277
1937	2,039,231	63	2,944	46,907	1,279,160	33	1,329,044
1938	1,988,041	61	6,966	38,506	1,214,355	78	1,259,905
1939	2,086,160	60.6	7,838	42,898	1,264,962	112	1,315,810
1940	2,149,821	62.9	8,591	44,036	1,353,214	142	1,405,983
1941	2,220,657	63.1	10,134	42,196	1,402,228	150	1,454,708
1942	2,093,100	66.2	10,365	34,815	1,386,645	151	1,431,976
1943	2,256,637	66.7	10,052	35,163	1,505,613	107	1,550,935
1944	2,592,289	64.7	10,099	38,203	1,677,904	109	1,726,315
1945	2,594,697	66.0	8,483	43,547	1,713,655	149	1,765,834
1946	2,745,430	63.2	7,586	49,235	1,733,939	269	1,791,029
1947	3,022,139	61.4	7,692	56,284	1,856,987	300	1,921,263
1948	3,433,225	58.8	12,287	58,508	2,020,185	159	2,091,139
1949	3,404,019	54.1	21,305	60,910	1,841,940	206	1,924,361
1950	3,803,027	51.9	29,044	72,443	1,973,574	156	2,075,217
1951	4,286,801	52.4	47,615	77,312	2,247,711	128	2,372,766
1952	4,508,954	50.8	61,237	77,275	2,289,836	36	2,428,384
1953	4,770,779	49.4	80,899	72,440	2,357,082	17	2,510,438
1954 *	5,031,011	46.0	96,080	83,636	2,314,988	57	2,494,761
1955 *	5,640,894	44.1	129,452	89,360	2,484,521	382	2,703,715
TOTAL	89,802,321	58.6	606,762	2,882,377	52,613,226	2,901	56,105,266

* World Oil from private sources.

TABLE 8

SOUTH AMERICA, SINCE BEGINNING IN 1896

(Thousand Barrels)

YEAR	Argentina	Barbados	Bolivia	Brazil	Chile	Colombia	Ecuador	Peru	Trinidad	Venezuela	Total South America
1896	.....	.....	.....	.....	.....	.....	.....	47	.....	.....	47
1897	.....	.....	.....	.....	.....	.....	.....	71	.....	.....	71
1898	.....	.....	.....	.....	.....	.....	.....	71	.....	.....	71
1899	.....	.....	.....	.....	.....	.....	.....	89	.....	.....	89
1900	.....	.....	.....	.....	.....	.....	.....	274	.....	.....	274
1901	.....	.....	.....	.....	.....	.....	.....	275	.....	.....	275
1902	.....	.....	.....	.....	.....	.....	.....	287	.....	.....	287
1903	.....	.....	.....	.....	.....	.....	.....	278	.....	.....	278
1904	.....	.....	.....	.....	.....	.....	.....	290	.....	.....	290
1905	.....	.....	.....	.....	.....	.....	.....	373	.....	.....	373
1906	.....	.....	.....	.....	.....	.....	.....	531	.....	.....	531
1907	...B.....	.....	.....	.....	.....	.....	.....	751	.....	.....	751
1908	12	.....	.....	.....	.....	.....	.....	945	B	.....	957
1909	18	.....	.....	.....	.....	.....	.....	1,411	57	.....	1,486
1910	20	.....	.....	.....	.....	.....	.....	1,258	143	.....	1,421
1911	13	.....	.....	.....	.....	.....	.....	1,465	285	.....	1,763
1912	47	.....	.....	.....	.....	.....	.....	1,752	437	.....	2,236
1913	131	.....	.....	.....	.....	.....	.....	2,071	504	.....	2,706
1914	276	.....	.....	.....	.....	.....	.....	1,837	644	.....	2,757
1915	513	.....	.....	.....	.....	.....	.....	2,579	750	.....	3,842
1916	867	.....	.....	.....	.....	.....	.....	2,593	929	.....	4,389
1917	1,218	.....	.....	.....	.....	.....	57	2,577	1,602	120	5,574
1918	1,353	.....	.....	.....	.....	.....	C60	2,527	2,082	333	6,355
1919	1,331	.....	.....	.....	.....	.....	C60	2,628	1,841	425	6,285
1920	1,651	.....	.....	.....	.....	.....	C60	2,817	2,083	457	7,068
1921	2,036	.....	.....	.....	.....	67	C60	3,699	2,354	1,433	9,649
1922	2,866	.....	.....	.....	.....	323	C60	5,314	2,445	2,201	13,209
1923	3,400	.....	.....	.....	.....	425	87	5,699	3,051	4,201	16,863
1924	4,639	.....	.....	.....	.....	445	C100	8,379	4,057	9,042	26,662
1925	6,336	.....	.....	.....	.....	1,007	160	9,232	4,387	19,687	40,809
1926	7,851	14	21	.....	.....	6,444	214	10,762	4,971	36,911	67,153
1927	8,630	.....	.....	.....	.....	15,014	537	10,127	5,380	63,134	102,822
1928	9,070	.....	.....	.....	.....	19,897	1,084	12,006	7,684	105,749	155,490
1929	9,391	.....	B	.....	.....	20,385	1,381	13,422	8,716	137,472	190,767
1930	9,002	.....	56	.....	.....	20,346	1,553	12,449	9,419	136,669	189,494
1931	11,709	.....	25	.....	.....	18,237	1,762	10,089	9,744	116,613	168,179
1932	13,139	.....	44	.....	.....	16,414	1,597	9,899	10,126	116,541	167,760
1933	13,691	.....	112	.....	.....	13,158	1,620	13,257	9,561	117,720	169,119
1934	14,024	.....	159	.....	.....	17,341	1,637	16,314	10,894	136,103	196,472
1935	14,297	.....	164	.....	.....	17,598	1,732	17,067	11,671	148,254	210,783
1936	15,458	.....	105	.....	.....	18,756	1,942	17,593	13,237	154,794	221,885
1937	16,355	.....	122	.....	.....	20,599	2,161	17,457	15,503	186,230	258,427
1938	17,076	.....	226	.....	.....	21,582	2,246	15,839	17,737	188,174	262,880
1939	18,613	.....	215	.....	.....	23,857	2,313	13,508	19,270	206,470	284,246
1940	20,609	.....	288	2	.....	25,593	2,349	12,126	22,227	185,570	268,764
1941	21,873	.....	235	3	.....	24,553	1,557	11,935	20,506	228,430	309,092
1942	32,704	2	308	33	.....	10,487	2,278	13,629	22,069	147,675	220,185
1943	27,714	2	334	48	.....	13,261	2,315	14,654	21,385	177,631	257,344
1944	24,230	1	314	58	.....	22,291	2,965	14,389	22,139	257,046	343,435
1945	22,881	2	382	79	.....	22,449	2,664	13,744	21,093	323,156	406,450
1946	20,604	1	363	67	.....	22,118	2,323	12,468	20,233	388,486	466,603
1947	21,846	B	377	97	.....	24,794	2,282	12,764	20,521	434,905	517,586
1948	23,734	.....	464	144	.....	23,792	2,563	14,069	20,111	490,015	574,892
1949	22,589	.....	678	109	.....	29,722	2,617	14,790	20,617	482,316	573,438
1950	23,353	.....	616	339	629	34,060	2,632	15,012	20,632	546,783	644,056
1951	24,465	.....	523	691	759	38,398	2,708	16,110	20,848	622,216	726,713
1952	24,825	.....	526	750	906	28,683	2,839	16,403	21,258	660,254	766,444
1953	28,501	.....	601	916	1264	40,179	2,967	15,999	22,346	644,243	757,016
1954	29,590	.....	1695	992	1736	39,621	3,146	17,162	23,628	692,294	809,864
1955	30,457	.....	2692	2014	2577	39,363	3,531	17,246	24,896	787,384	910,160
TOTAL	596,008	8	11684	6342	7871	701,259	64,221	484,409	526,068	8,957,137	11,354,947

Source: World Oil Ibid.

EUROPE, 1901 TO NOW

(Thousand Barrels)

YEAR	Albania	Austria	Czecho-Slovakia	Great Britain	France	Germany	Hungary	Italy	Netherlands	Poland	Rumania	USSR (Russia)	Yugoslavia	Total Europe
1901	.....	.....	.....	.....	.....	314	.....	16	.....	3,251	1,678	85,168	.....	90,427
1902	.....	.....	.....	.....	.....	354	.....	19	.....	4,142	2,060	80,540	.....	87,115
1903	.....	.....	.....	.....	.....	446	.....	18	.....	5,235	2,763	75,591	.....	84,053
1904	.....	.....	.....	.....	.....	637	.....	26	.....	5,947	3,599	78,537	.....	88,746
1905	.....	.....	.....	.....	.....	561	.....	44	.....	5,766	4,421	54,960	.....	65,752
1906	.....	.....	.....	.....	.....	579	.....	54	.....	5,468	6 ,378	58,897	.....	71,376
1907	.....	.....	.....	.....	.....	757	.....	60	.....	8,456	8,118	61,851	.....	79,242
1908	.....	.....	.....	.....	.....	1,009	.....	51	.....	12,612	8,252	62,187	.....	84,111
1909	.....	.....	.....	.....	.....	1,019	.....	42	.....	14,933	9,327	65,970	.....	91,291
1910	.....	.....	.....	.....	.....	1,032	.....	51	.....	12,673	9,724	70,337	.....	93,817
1911	.....	.....	.....	.....	.....	1,017	.....	75	.....	10,519	11,108	66,184	.....	88,903
1912	.....	.....	.....	.....	.....	1,037	.....	54	.....	8,535	12,976	68,019	.....	90,615
1913	.....	.....	.....	.....	.....	8,857	.....	47	.....	7,818	13,555	62,834	.....	85,111
1914	.....	.....	.....	.....	.....	781	.....	40	.....	6,436	12,827	67,020	.....	87,104
1915	.....	.....	.....	.....	.....	703	.....	44	.....	5,352	12,030	68,548	.....	86,677
1916	.....	.....	.....	.....	.....	656	.....	51	.....	6,587	8,945	65,817	.....	82,056
1917	.....	.....	.....	.....	G	642	.....	41	.....	6,228	3,721	63,072	.....	73,704
1918	.....	.....	.....	.....	363	270	.....	35	.....	6,032	8,730	27,168	.....	42,598
1919	.....	.....	48	2	334	265	.....	35	.....	6,096	6,618	31,752	.....	47,150
1920	.....	.....	69	3	356	246	.....	35	.....	5,607	7,435	25,430	.....	39,181
1921	.....	.....	94	3	389	274	.....	32	.....	5,167	8,368	28,968	.....	43,295
1922	.....	.....	120	1	496	319	.....	31	.....	5,227	9,843	35,692	.....	51,729
1923	.....	.....	74	1	494	346	.....	34	.....	5,402	10,867	39,147	.....	56,365
1924	.....	.....	76	2	497	406	.....	39	.....	5,657	13,369	45,355	.....	65,401
1925	.....	.....	158	3	459	541	.....	61	.....	5,960	16,650	52,448	.....	76,280
1926	.....	.....	150	2	478	653	.....	41	.....	5,844	23,314	64,311	.....	94,793
1927	.....	.....	112	2	514	663	.....	47	.....	5,342	26,368	77,018	.....	110,056
1928	.....	.....	94	1	512	630	.....	46	.....	5,492	30,773	D84,745	.....	122,293
1929	.....	.....	93	.....	535	704	.....	45	.....	4,988	34,758	D99,507	.....	140,630
1930	.....	.....	157	B	523	1,182	.....	59	.....	4,904	41,624	D125,555	.....	174,004
1931	.....	.....	134	B	520	1,606	.....	124	.....	4,662	49,127	162,842	.....	219,015
1932	.....	.....	126	B	530	1,608	.....	208	.....	4,226	53,815	154,367	.....	214,770
1933	11	.....	122	B	562	1,665	.....	204	.....	4,072	54,020	154,850	.....	215,496
1934	10	.....	178	B	557	2,187	.....	151	.....	3,913	62,063	174,318	.....	243,377
1935	41	44	133	B	541	2,996	.....	119	.....	3,812	61,310	182,386	2	251,384
1936	273	50	127	B	503	3,115	.....	123	.....	3,789	63,659	186,206	1	257,846
1937	619	221	123	B	502	3,176	16	110	.....	3,716	52,452	193,241	4	254,180
1938	752	383	130	B	513	3,861	288	101	.....	3,763	48,487	204,956	9	263,243
1939	934	1,240	120	.....	500	4,487	1,103	91	.....	3,898	45,648	216,866	10	274,897
1940	1,497	2,808	163	124	496	7,371	1,881	85	.....	3,891	43,168	218,600	10	280,094
1941	1,334	4,238	183	223	414	6,303	3,183	95	.....	1,793	40,517	238,150	10	296,443
1942	1,601	5,899	271	605	463	5,191	5,027	101	.....	2,794	42,094	227,470	10	291,536
1943	1,001	7,478	200	839	356	4,973	6,347	86	1	3,500	39,182	209,750	10	264,723
1944	334	8,208	185	702	300	6,154	6,277	55	12	3,000	26,191	27,000	220	326,649
1945	267	3,074	91	532	202	3,935	5,018	53	41	750	34,772	148,953	200	197,888
1946	1,000	5,734	196	412	368	4,539	5,146	83	435	866	31,434	157,673	160	208,046
1947	2,000	6,285	210	351	356	4,022	4,330	81	1,478	951	28,552	187,463	290	236,379
1948	1,500	5,149	204	323	369	4,489	3,647	71	3,443	1,039	34,000	218,000	270	273,504
1949	2,188	6,100	292	338	411	5,947	3,791	71	4,314	1,125	33,700	237,700	470	296,447
1950	2,800	10,200	292	340	909	8,107	3,700	63	4,897	1,205	32,000	266,200	794	331,507
1951	1,200	15,477	644	335	2,036	9,681	3,500	135	4,942	1,502	31,000	285,000	1,067	356,519
1952	1,100	20,400	740	407	2,377	12,435	3,500	487	4,975	1,700	45,000	322,400	1,091	416,612
1953	1,400	21,100	900	410	2,555	15,505	5,000	656	5,501	1,800	52,000	363,000	1,236	471,263
1954*	1,560	23,079	947	435	3,591	18,930	8,362	889	6,526	1,910	74,350	422,881	1,465	564,925
1955*	1,871	24,886	1,117	394	6,409	22,345	10,970	2,536	7,137	2,800	78,588	514,433	1,736	675,222
TOTAL	25,293	173,063	9,073	6,791	32,280	185,750	81,096	8,257	43,902	289,530	1538,524	8,470,462	9,065	10873,086

Source: World Oil Ibid.

TABLE 18

ASIA SINCE BEGINNING IN 1875

(Thousand Barrels)

YEAR	Burma	Pakistan	India	China	Indonesia	Japan	New Guinea	Sakhalin	Sarawak-Brunei	Formosa	Total Far East
1874	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1875	.....	.....	.....	.....	.....	5	.....	.....	.....	.....	5
1876	.....	.....	.....	.....	.....	7	.....	.....	.....	.....	7
1877	.....	.....	.....	.....	.....	10	.....	.....	.....	.....	10
1878	.....	.....	.....	.....	.....	18	.....	.....	.....	.....	18
1879	.....	.....	.....	.....	.....	23	.....	.....	.....	.....	23
1880	.....	.....	.....	.....	.....	26	.....	.....	.....	.....	26
1881	.....	.....	.....	.....	.....	17	.....	.....	.....	.....	17
1882	.....	.....	.....	.....	.....	15	.....	.....	.....	.....	15
1883	.....	.....	.....	.....	.....	20	.....	.....	.....	.....	20
1884	.....	.....	.....	.....	.....	28	.....	.....	.....	.....	28
1885	.....	.....	.....	.....	.....	30	.....	.....	.....	.....	30
1886	.....	.....	.....	.....	.....	38	.....	.....	.....	.....	38
1887	.....	.....	.....	.....	.....	29	.....	.....	.....	.....	29
1888	.....	.....	.....	.....	.....	37	.....	.....	.....	.....	37
1889	.....	94	.....	.....	.....	53	.....	.....	.....	.....	147
1890	.....	118	.....	.....	.....	52	.....	.....	.....	.....	170
1891	.....	190	.....	.....	.....	53	.....	.....	.....	.....	243
1892	.....	242	.....	.....	.....	69	.....	.....	.....	.....	311
1893	.....	299	.....	.....	600	106	.....	.....	.....	.....	1,005
1894	.....	327	.....	.....	688	173	.....	.....	.....	.....	1,188
1895	.....	372	.....	.....	1,216	170	.....	.....	.....	.....	1,758
1896	.....	430	.....	.....	1,427	237	.....	.....	.....	.....	2,094
1897	.....	546	.....	.....	2,552	262	.....	.....	.....	.....	3,360
1898	.....	542	.....	.....	2,964	390	.....	.....	.....	.....	3,825
1899	.....	941	.....	.....	1,796	539	.....	.....	.....	.....	3,276
1900	.....	1,079	.....	.....	2,253	871	.....	.....	.....	.....	4,203
1901	.....	1,431	.....	.....	4,014	1,117	.....	.....	.....	.....	6,562
1902	.....	1,617	.....	.....	2,430	996	.....	.....	.....	.....	5,043
1903	.....	2,510	.....	.....	5,770	1,209	.....	.....	.....	.....	9,480
1904	.....	3,385	.....	.....	6,508	1,219	.....	.....	.....	.....	11,112
1905	.....	4,137	.....	.....	7,850	1,347	.....	.....	.....	.....	13,334
1906	.....	4,016	.....	.....	8,181	1,564	.....	.....	.....	.....	13,761
1907	.....	4,344	.....	.....	9,983	1,718	.....	.....	.....	.....	16,045
1908	.....	5,047	.....	.....	10,283	1,871	.....	.....	.....	.....	17,291
1909	.....	6,677	.....	.....	11,042	1,887	.....	.....	.....	.....	19,606
1910	.....	6,138	.....	.....	11,031	1,829	.....	.....	.....	.....	18,998
1911	.....	1,451	.....	.....	12,173	1,737	.....	.....	.....	.....	20,361
1912	.....	7,117	.....	.....	10,846	1,659	.....	.....	.....	.....	19,629
1913	.....	7,930	.....	.....	11,172	1,940	.....	.....	.....	.....	21,183
1914	.....	7,410	.....	.....	11,422	2,636	.....	.....	141 141	.....	21,786
1915	.....	8,202	.....	.....	11,920	2,928	.....	.....	318	.....	23,442
1916	.....	8,491	.....	.....	12,547	2,933	.....	.....	392	.....	24,630
1917	.....	8,079	.....	.....	13,180	2,861	.....	.....	629	.....	24,662
1918	.....	8,188	.....	.....	12,778	2,441	.....	.....	542	.....	23,911
1919	.....	8,736	.....	.....	15,508	2,238	.....	.....	504	.....	27,078
1920	.....	8,3 75	.....	.....	17,529	2T221	.....	.....	596	.....	29,145
1921	.....	8,734	.....	.....	16,958	2,233	.....	2	1,020	.....	29,338
1922	.....	8,529	.....	.....	17,066	2,065	.....	7	1,411	.....	30,506
1923	.....	8,406	.....	.....	19,870	1,804	.....	9	2,849	.....	34,029
1924	.....	8,416	.....	.....	20,473	1,814	.....	80	3,940	.....	34,946
1925	.....	8,274	.....	.....	21,422	1,915	.....	87	4,163	.....	35,955
1926	.....	8,011	.....	.....	21,243	1,785	.....	181	4,257	.....	36,162
1927	.....	8,032	.....	.....	27,459	1,789	.....	440	4,942	.....	42,663
1928	.....	8,741	.....	.....	32,118	1,944	.....	677	4,943	.....	48,703
1929	.....	8,747	.....	.....	38,279	2,023	.....	D1,134	G5,223	.....	56,473
1930	.....	8,292	.....	.....	41,729	1,950	.....	D1,805	5,290	.....	58,683
1931	.....	8,200	.....	.....	35,539	2,050	.....	2,734	4,907	.....	52,377
1932	.....	8,817	.....	.....	39,001	1,630	.....	2,631	3,854	.....	55,875
1933	.....	8,743	.....	.....	42,606	1,455	.....	2,338	3,796	.....	59,632
1934	.....	10,503	.....	.....	46,925	1,834	.....	2,881	4,490	.....	67,283
1935	7,181	E	2,038	.....	47,171	2,249	.....	2,545	5,140	.....	66,730
1936	7,588	E	1,978	.....	50,025	2,440	.....	3,212	5,546	.....	70,452
1937	7,848	E	2,162	.....	56,724	2,488	.....	3,656	5,209	.....	78,887
1938	7,538	E	2,488	.....	57,318	2,511	.....	C 3,821	6,009	.....	80,589
1939	7,873	E	2,327	 4	62,087	2,654	.....	4,000	6,913	.....	86,042
1940	7,731	E	2,302	10	62,011	2,639	.....	4,000	7,097	.....	85,740
1941	7,762	E	2,899	87	53,704	1,929	.....	4,000	7,047	.....	77,307
1942	2,500	E	2,792	340	24,000	1,652	.....	4,000	6,864	62	38,332
1943	1,000	E	2,735	447	48,294	1,727	.....	5,000	3,000	48	63,741
1944	750	E	2,784	505	22,260	1,601	.....	5,000	4,500	38	38,940
1945	725	E	2,363	454	7,600	1,544	.....	6,000	6,000	40	20,830
1946	15	E	2,193	513	2,100	1,343	.....	6,000	2,100	14	14,230
1947	59	356	1,863	374	8,020	1,276	.....	6,000	2,050	16	31,940
1948	341	490	1,875	533	31,765	1,122	135	C7,000	12,970	22	63,408
1949	248	824	1,906	730	43,206	1,353	1,726	7,000	20,124	23	82,123
1950	532	1,281	1,867	800	48,400	2,066	1,748	7,000	25,108	22	94,675
1951	858	1,348	1,949	900	55,453	2,337	1,746	7,000	30,958	23	109,118
1952	942	1,580	1,900	1,000	62,495	2,134	1,725	7,000	37,506	21	117,045
1953	1,073	1,762	2,215	1,500	75,148	2,101	1,751	7,000	38,251	18	129,415
1954*	1,550	1,948	2,235	11,000	80,300	2,157	4,370	7,000	36,848	17	146,921
1955*	1,678	2,068	2,526	13,200	85,921	2,229	3,418	7,300	36,326	35	157,655
TOTAL		368,692		32,427	1,625,353	109,421	16,619	129,540	403,124	24	2,685,599
										423	

Source: World Oil Ibid.

ASIA SINCE BEGINNING IN 1875 - M.E.

(Thousand Barrels)

YEAR	Bahrain	Iran	Iraq	Kuwait	Neutral Zone	Qatar	Saudi Arabia	Turkey	Middle East Total
1874	.....	.....	.....	.....	.....	.....	.....	.....	.....
1875	.....	.....	.....	.....	.....	.....	.....	.....	.....
1876	.....	.....	.....	.....	.....	.....	.....	.....	.....
1877	.....	.....	.....	.....	.....	.....	.....	.....	.....
1878	.....	.....	.....	.....	.....	.....	.....	.....	.....
1879	.....	.....	.....	.....	.....	.....	.....	.....	.....
1880	.....	.....	.....	.....	.....	.....	.....	.....	.....
1881	.....	.....	.....	.....	.....	.....	.....	.....	.....
1881	.....	.....	.....	.....	.....	.....	.....	.....	.....
1882	.....	.....	.....	.....	.....	.....	.....	.....	.....
1883	.....	.....	.....	.....	.....	.....	.....	.....	.....
1884	.....	.....	.....	.....	.....	.....	.....	.....	.....
1885	.....	.....	.....	.....	.....	.....	.....	.....	.....
1886	.....	.....	.....	.....	.....	.....	.....	.....	.....
1887	.....	.....	.....	.....	.....	.....	.....	.....	.....
1888	.....	.....	.....	.....	.....	.....	.....	.....	.....
1889	.....	.....	.....	.....	.....	.....	.....	.....	.....
1890	.....	.....	.....	.....	.....	.....	.....	.....	.....
1891	.....	.....	.....	.....	.....	.....	.....	.....	.....
1892	.....	.....	.....	.....	.....	.....	.....	.....	.....
1893	.....	.....	.....	.....	.....	.....	.....	.....	.....
1894	.....	.....	.....	.....	.....	.....	.....	.....	.....
1895	.....	.....	.....	.....	.....	.....	.....	.....	.....
1896	.....	.....	.....	.....	.....	.....	.....	.....	.....
1897	.....	.....	.....	.....	.....	.....	.....	.....	.....
1898	.....	.....	.....	.....	.....	.....	.....	.....	.....
1899	.....	.....	.....	.....	.....	.....	.....	.....	.....
1900	.....	.....	.....	.....	.....	.....	.....	.....	.....
1901	.....	.....	.....	.....	.....	.....	.....	.....	.....
1902	.....	.....	.....	.....	.....	.....	.....	.....	.....
1903	.....	.....	.....	.....	.....	.....	.....	.....	.....
1904	.....	.....	.....	.....	.....	.....	.....	.....	.....
1905	.....	.....	.....	.....	.....	.....	.....	.....	.....
1906	.....	.....	.....	.....	.....	.....	.....	.....	.....
1907	.....	.....	.....	.....	.....	.....	.....	.....	.....
1908	.....	.....	.....	.....	.....	.....	.....	.....	.....
1909	.....	.....	.....	.....	.....	.....	.....	.....	.....
1910	.....	.....	.....	.....	.....	.....	.....	.....	.....
1911	.....	.....	.....	.....	.....	.....	.....	.....	.....
1912	.....	.....	.....	.....	.....	.....	.....	.....	.....
1913	.....	1,857	.....	.....	.....	.....	.....	.....	1,857
1914	.....	2,910	.....	.....	.....	.....	.....	.....	2,910
1915	.....	3,616	.....	.....	.....	.....	.....	.....	3,616
1916	.....	4,477	.....	.....	.....	.....	.....	.....	4,477
1917	.....	7,147	.....	.....	.....	.....	.....	.....	7,147
1918	.....	8,623	.....	.....	.....	.....	.....	.....	8,623
1919	.....	10,139	.....	.....	.....	.....	.....	.....	10,139
1920	.....	12,230	.....	.....	.....	.....	.....	.....	12,230
1921	.....	16,673	.....	.....	.....	.....	.....	.....	16,673
1922	.....	22,247	.....	.....	.....	.....	.....	.....	22,247
1923	.....	25,230	.....	.....	.....	.....	.....	.....	25,230
1924	.....	32,373	.....	.....	.....	.....	.....	.....	32,373
1925	.....	35,038	.....	.....	.....	.....	.....	.....	35,038
1926	.....	35,842	.....	.....	.....	.....	.....	.....	35,842
1927	.....	39,688	338	.....	.....	.....	.....	.....	40,026
1928	.....	43,461	713	.....	.....	.....	.....	.....	44,174
1929	.....	42,145	798	.....	.....	.....	.....	.....	42,943
1930	.....	45,828	913	.....	.....	.....	.....	.....	46,741
1931	.....	44,376	830	.....	.....	.....	.....	.....	45,206
1932	.....	49,471	836	.....	.....	.....	.....	.....	50,307
1933	31	54,392	917	.....	.....	.....	.....	.....	55,340
1934	285	57,851	7,689	.....	.....	.....	.....	.....	65,825
1935	1,265	57,273	27,408	.....	.....	.....	.....	.....	85,946
1936	4,685	62,718	30,406	.....	.....	.....	20	.....	97,789
1937	7,762	77,804	31,836	.....	.....	.....	65	.....	117,467
1938	8,298	78,372	32,643	.....	.....	.....	495	.....	119,808
1939	7,589	78,151	30,791	.....	.....	.....	3,934	.....	120,465
1940	7,074	66,317	24,225	.....	.....	.....	5,075	.....	102,691
1941	6,794	50,777	12,650	.....	.....	.....	4,310	.....	74,531
1942	6,241	72,256	19,726	.....	.....	.....	4,530	.....	102,753
1943	6,572	74,612	24,848	.....	.....	.....	4,868	.....	110,900
1944	6,714	102,045	30,943	.....	.....	.....	7,794	.....	147,496
1945	7,309	130,526	35,112	.....	.....	.....	21,311	.....	194,258
1946	8,010	146,819	35,665	5,931	.....	.....	59,944	.....	256,369
1947	9,411	154,998	35,834	16,225	.....	.....	89,852	.....	306,320
1948	10,915	190,384	26,115	46,500	.....	.....	142,853	13	416,780
1949	10,985	204,712	30,957	90,000	.....	750	174,008	95	511,507
1950	11,016	242,475	49,726	125,722	.....	12,258	199,547	108	640,862
1951	10,994	127,600	65,122	204,910	.....	18,009	277,963	133	704,731
1952	11,004	10,100	141,100	273,433	.....	25,255	301,861	146	762,899
1953	10,978	9,400	210,268	314,592	.....	31,025	308,294	179	844,736
1954*	10,991	21,316	228,468	347,557	5,991	36,732	347,845	413	999,313
1955*	10,982	120,137	246,479	398,494	8,848	41,088	352,240	1,199	1,180,187
TOTAL	175,865	2,674,406	1,383,356	1,823,364	14,839	165,847	2,306,809	2,286	8,546,772

Source: World Oil Ibid.

ASIA SINCE BEGINNING IN 1875 - M.E.

(Thousand Barrels)

YEAR	Bahrain	Iran	Iraq	Kuwait	Neutral Zone	Qatar	Saudi Arabia	Turkey	Middle East Total
1874	.....	.....	.....	.....	.....	.....	.....	.....	.....
1875	.....	.....	.....	.....	.....	.....	.....	.....	.....
1876	.....	.....	.....	.....	.....	.....	.....	.....	.....
1877	.....	.....	.....	.....	.....	.....	.....	.....	.....
1878	.....	.....	.....	.....	.....	.....	.....	.....	.....
1879	.....	.....	.....	.....	.....	.....	.....	.....	.....
1880	.....	.....	.....	.....	.....	.....	.....	.....	.....
1881	.....	.....	.....	.....	.....	.....	.....	.....	.....
1881	.....	.....	.....	.....	.....	.....	.....	.....	.....
1882	.....	.....	.....	.....	.....	.....	.....	.....	.....
1883	.....	.....	.....	.....	.....	.....	.....	.....	.....
1884	.....	.....	.....	.....	.....	.....	.....	.....	.....
1885	.....	.....	.....	.....	.....	.....	.....	.....	.....
1886	.....	.....	.....	.....	.....	.....	.....	.....	.....
1887	.....	.....	.....	.....	.....	.....	.....	.....	.....
1888	.....	.....	.....	.....	.....	.....	.....	.....	.....
1889	.....	.....	.....	.....	.....	.....	.....	.....	.....
1890	.....	.....	.....	.....	.....	.....	.....	.....	.....
1891	.....	.....	.....	.....	.....	.....	.....	.....	.....
1892	.....	.....	.....	.....	.....	.....	.....	.....	.....
1893	.....	.....	.....	.....	.....	.....	.....	.....	.....
1894	.....	.....	.....	.....	.....	.....	.....	.....	.....
1895	.....	.....	.....	.....	.....	.....	.....	.....	.....
1896	.....	.....	.....	.....	.....	.....	.....	.....	.....
1897	.....	.....	.....	.....	.....	.....	.....	.....	.....
1898	.....	.....	.....	.....	.....	.....	.....	.....	.....
1899	.....	.....	.....	.....	.....	.....	.....	.....	.....
1900	.....	.....	.....	.....	.....	.....	.....	.....	.....
1901	.....	.....	.....	.....	.....	.....	.....	.....	.....
1902	.....	.....	.....	.....	.....	.....	.....	.....	.....
1903	.....	.....	.....	.....	.....	.....	.....	.....	.....
1904	.....	.....	.....	.....	.....	.....	.....	.....	.....
1905	.....	.....	.....	.....	.....	.....	.....	.....	.....
1906	.....	.....	.....	.....	.....	.....	.....	.....	.....
1907	.....	.....	.....	.....	.....	.....	.....	.....	.....
1908	.....	.....	.....	.....	.....	.....	.....	.....	.....
1909	.....	.....	.....	.....	.....	.....	.....	.....	.....
1910	.....	.....	.....	.....	.....	.....	.....	.....	.....
1911	.....	.....	.....	.....	.....	.....	.....	.....	.....
1912	.....	.....	.....	.....	.....	.....	.....	.....	.....
1913	.....	1,857	.....	.....	.....	.....	.....	.....	1,857
1914	.....	2,910	.....	.....	.....	.....	.....	.....	2,910
1915	.....	3,616	.....	.....	.....	.....	.....	.....	3,616
1916	.....	4,477	.....	.....	.....	.....	.....	.....	4,477
1917	.....	7,147	.....	.....	.....	.....	.....	.....	7,147
1918	.....	8,623	.....	.....	.....	.....	.....	.....	8,623
1919	.....	10,139	.....	.....	.....	.....	.....	.....	10,139
1920	.....	12,230	.....	.....	.....	.....	.....	.....	12,230
1921	.....	16,673	.....	.....	.....	.....	.....	.....	16,673
1922	.....	22,247	.....	.....	.....	.....	.....	.....	22,247
1923	.....	25,230	.....	.....	.....	.....	.....	.....	25,230
1924	.....	32,373	.....	.....	.....	.....	.....	.....	32,373
1925	.....	35,038	.....	.....	.....	.....	.....	.....	35,038
1926	.....	35,842	.....	.....	.....	.....	.....	.....	35,842
1927	.....	39,688	338	.....	.....	.....	.....	.....	40,026
1928	.....	43,461	713	.....	.....	.....	.....	.....	44,174
1929	.....	42,145	798	.....	.....	.....	.....	.....	42,943
1930	.....	45,828	913	.....	.....	.....	.....	.....	46,741
1931	.....	44,376	830	.....	.....	.....	.....	.....	45,206
1932	.....	49,471	836	.....	.....	.....	.....	.....	50,307
1933	31	54,392	917	.....	.....	.....	.....	.....	55,340
1934	285	57,851	7,689	.....	.....	.....	.....	.....	65,825
1935	1,265	57,273	27,408	.....	.....	.....	.....	.....	85,946
1936	4,485	62,718	30,406	.....	.....	.....	20	.....	97,789
1937	7,762	77,804	31,836	.....	.....	.....	65	.....	117,467
1938	8,298	78,372	32,643	.....	.....	.....	495	.....	119,808
1939	7,589	78,151	30,791	.....	.....	.....	3,934	.....	120,465
1940	7,074	66,317	24,225	.....	.....	.....	5,075	.....	102,691
1941	6,794	50,777	12,650	.....	.....	.....	4,310	.....	74,531
1942	6,241	72,256	19,726	.....	.....	.....	4,530	.....	102,753
1943	6,572	74,612	24,848	.....	.....	.....	4,868	.....	110,900
1944	6,714	102,045	30,943	.....	.....	.....	7,794	.....	147,496
1945	7,309	130,526	35,112	.....	.....	.....	21,311	.....	194,258
1946	8,010	146,819	35,665	5,931	.....	.....	59,944	.....	256,369
1947	9,411	154,998	35,834	16,225	.....	.....	89,852	.....	306,320
1948	10,915	190,384	26,115	46,500	.....	.....	142,853	13	416,780
1949	10,985	204,712	30,957	90,000	.....	750	174,008	95	511,507
1950	11,016	242,475	49,726	125,722	.....	12,268	199,547	108	640,862
1951	10,994	127,600	65,122	204,910	.....	18,009	277,963	133	704,731
1952	11,004	10,100	141,100	273,433	.....	25,255	301,861	146	762,899
1953	10,978	9,400	210,268	314,592	.....	31,025	308,294	179	844,736
1954*	10,991	21,316	228,468	347,557	5,991	36,732	347,845	413	999,313
1955*	10,982	120,137	246,479	398,494	8,848	41,088	352,240	1,199	1,180,187
TOTAL	175,865	2,674,406	1,383,356	1,823,364	14,839	165,847	2,306,809	2,286	8,546,772

Source: World Oil Ibid.

TABLE 12

AFRICA, 1901 TO NOW

(Thousand Barrels)

YEAR	EGYPT	ALGERIA	MOROCCO	TOTAL AFRICA	AUSTRALIA-NEW ZEALAND	REST OF WORLD
1901	.....	1....	..2...	.....	.....	20
1902	.....	.....	.....	.....	.....	26
1903	.....	.....	.....	.....	.....	36
1904	.....	.....	.....	.....	.....	40
1905	.....	.....	.....	.....	.....	30
1906	.....	.....	.....	.....	.....	30
1907	.....	.....	.....	.....	.....	30
1908	.....	.....	.....	.....	.....	30
1909	.....	.....	.....	.....	.....	20
1910	.....	.....	.....	.....	.....	20
1911	...21	.....	.....	21	.....	20
1912	214	.....	.....	214	.....	20
1913	98	.....	.....	98	.....	20
1914	753	1	.....	754	.....	20
1915	212	4	.....	216	.....	10
1916	404	8	.....	412	.....	25
1917	943	9	.....	952	.....	29
1918	1935	7	.....	1942	.....	25
1919	1517	5	.....	1522	.....	20
1920	1042	4	.....	1046	.....	20
1921	1255	3	.....	1258	.....	20
1922	1188	9	.....	1197	.....	22
1923	1054	9	.....	1063	.....	24
1924	1122	11	.....	1133	.....	24
1925	1226	12	.....	1238	.....	23
1926	1188	9	.....	1197	.....	17
1927	1267	8	.....	1275	.....	13
1928	1842	8	.....	1850	.....	15
1929	1868	20	.....	1888	.....	38
1930	1996	16	.....	2012	.....	40
1931	2038	B	.....	2038	.....	54
1932	1895	B	7	1902	.....	62
1933	1663	B	7	1670	.....	71
1934	1546	B	6	1552	.....	96
1935	1301	B	4	1305	5	4
1936	1278	B	4	1282	5	4
1937	1196	B	22	1218	4	4
1938	1581	B	27	1608	4	4
1939	4666	B	27	4693	3	4
1940	6505	B	27	6532	3	14
1941	8546	B	27	8573	3	..
1942	8275	B	41	8316	2	..
1943	8953	..	39	8992	2	..
1944	9416	4	32	9452	2	..
1945	9406	2	26	9434	3	..
1946	9070	1	20	9091	2	..
1947	8627	1	21	8649	2	..
1948	13398	1	100	13499	3	..
1949	15997	2	136	16125	8	..
1950	16373	24	305	16702	8	..
1951	16311	49	587	16947	7	..
1952	16464	348	749	17561	9	..
1953	16501	641	761	17903	8	..
1954	13760	575	884	15219	8	..
1955	12740	434	758	13932	23	..
TOTAL	228651	2225	4617	235493	114	1044

Source: WORLD OIL - International Outlook Issue, vol. 143, No. 3, August 15, 1956.

TABLE 13

WORLD CRUDE OIL PRODUCTION, BY COUNTRIES, 1954 AND 1955, CUMULATIVE THROUGH 1955

(Thousand Barrels)

CONTINENT AND COUNTRY	Annual Production (Thousands of Barrels)		Year's Production As Percent of World		Cumulative Production To January 1, 1956 (Thousands of Barrels)	
	1954	1955	1954	1955	Total	As Percentage of World
North America	2,494,761	2,703,715	49.58	47.93	56,105,266	62.47
Canada	96,080	129,452	1.90	2.29	606,762	0.67
Cuba	57	382	.....	0.01	2,901	.....
Mexico	83,636	89,360	1.67	1.58	2,882,377	3.21
United States	2,314,988	2,484,521	46.01	44.05	52,613,226	58.59
South America	809,864	910,160	16.10	16.13	11,354,947	12.65
Argentina	29,590	30,457	0.59	0.54	596,008	0.67
Barbadoes	.....	.....	.....	.....	8	.....
Bolivia	1,695	2,692	0.03	0.04	11,624	0.01
Brazil	992	2,014	0.02	0.04	6,342	.....
Chile	1,736	2,577	0.04	0.04	7,871	0.01
Colombia	39,621	39,363	0.79	0.70	701,259	0.79
Ecuador	3,146	3,531	0.06	0.07	64,221	0.07
Peru	17,162	17,246	0.34	0.30	484,409	0.54
Trinidad	23,628	24,896	0.47	0.44	526,068	0.58
Venezuela	692,294	787,384	13.76	13.96	8,957,137	9.98
Europe	564,925	675,222	11.23	11.97	10,873,086	12.10
Albania	1,560	1,871	0.03	0.03	25,293	0.02
Austria	23,079	24,886	0.46	0.44	173,063	0.20
Czechoslovakia	947	1,117	0.02	0.02	9,073	0.01
France	3,591	6,409	0.07	0.12	32,280	0.03
Germany	18,930	22,345	0.38	0.39	185,750	0.21
Great Britain	435	394	.....	0.01	6,791	0.01
Hungary	8,362	10,970	0.17	0.20	81,096	0.09
Italy and Sicily	889	2,536	0.02	0.04	8,257	0.01
Netherlands	6,526	7,137	0.13	0.13	43,902	0.05
Poland	1,910	2,800	0.04	0.05	289,530	0.32
Rumania	74,350	78,588	1.47	1.39	1,538,524	1.71
U.S.S.R. (Russia)	422,881	514,433	8.41	9.12	8,470,462	9.43
Yugoslavia	1,465	1,736	0.03	0.03	9,065	0.01
Africa	15,219	13,932	0.30	0.25	235,493	0.27
Algeria	575	434	0.01	0.01	2,225	....
Egypt	13,760	12,740	0.27	0.22	228,651	0.26
Morocco	884	758	0.02	0.02	4,617	0.01
Asia, Total	1,146,234	1,337,842	22.78	23.71	11,232,371	12.50
Asia, Middle East	999,313	1,180,187	19.86	20.92	8,546,772	9.51
Bahrain	10,991	10,982	0.22	0.19	175,865	0.19
Iran	21,316	120,137	0.43	2.13	2,674,406	2.98
Iran	228,468	246,479	4.54	4.37	1,383,356	1.54
Kuwait	347,557	398,494	6.90	7.07	1,823,364	2.03
Neutral Zone	5,991	8,848	0.12	0.15	14,839	0.02
Qatar	36,732	41,808	0.73	0.74	165,847	0.18
Saudi Arabia	347,845	352,240	6.91	6.25	2,306,809	2.57
Turkey	413	1,199	0.01	0.02	2,286	....
Asia, Far East	146,921	157,655	2.92	2.79	2,685,599	2.99
Burma	1,550	1,618	0.03	0.03	)	
India	2,235	2,526	0.04	0.04	) 368,692	0.41
Pakistan	1,948	2,068	0.04	0.04	)	
China	11,000	13,200	0.22	0.23	32,427	0.04
Indonesia	80,300	85,921	1.60	1.53	1,625,353	1.81
Japan	2,157	2,229	0.04	0.04	109,421	0.12
New Guinea	4,370	3,418	0.09	0.06	16,691	0.02
Sakhalin	7,000	7,300	0.14	0.13	129,540	0.14
Sarawak- Brunei	36,326	39,351	0.72	0.69	403,124	0.45
Taiwan (Formosa)	35	24	....	....	423	....
Australia-New Zealand	8	23	0.01	....	114	....
World, Undistributed	.....	.....	....	....	1,044	0.01
WORLD TOTAL	5,031,011	5,640,894	100.00	100.00	89,802,321	100.00

Source: World Oil Ibid.

consumption rose from 10 per cent in 1938 to 12.7 per cent in 1951 and to 13.2 per cent in 1954, and 15 per cent in 1955.(1)

A most remarkable feature of the growth of world oil consumption in recent years has been the extremely high rate of growth in the developed regions of Japan, Canada, and especially Western Europe. Since 1948, consumption in Western Europe continued to increase at a rate of 14 per cent.(2) In 1955 Western Europe recorded a 17 per cent increase, which was the highest rate in the world. Consumption of oil products in Western Europe rose from a total of 27 million tons to 100 million metric tons in 1955.(3)

II. World Production and Oil Producing Areas

A. Historical Background

Since Colonel Drake first struck oil near Titusville, Pennsylvania, in 1859, statistics show a phenomenal rise in the United States and world production to meet ever-increasing consumption requirements. From 6,000 barrels produced in 1859, world production rose up to 89,802,31 thousand barrels in 1955. This is a colossal increase over nearly the span of one century.

In the year 1900, only 21 million tons were produced.(4) World production was then equal to that of Kuwait in 1950.

---

1. Ibid.
2. P.P.S. "Features of Europe's Mounting Needs", Vol. XXIII, No. 10, p. 359, October 1956.
3. Iraq Petroleum Company, Iraq Oil in 1955, op.cit., p. 25.
4. World Oil, Vol. 143, No. 3, August 15, 1956, p. 148.

Russia was the largest producer in 1900, producing about 75,780 thousand barrels[1] and the United States was then the second largest producer in the world, producing 63,621 thousand barrels. These two together accounted for 95 per cent of the world's petroleum production then. It was not until 1920 that a production rate of 100 million tons a year was reached, and not until 1930 that the 200 million mark was approached.[2] From 1903 onwards, the U.S.A. has permanently occupied the first place among the world's oil producers. Russia suffered a great setback during and after 1917 Revolution, but reestablished herself as a leading producer in the course of the 1920's.[3]

It was in the year 1913, when the first country in the Middle East started oil production on a large scale (excluding Egypt). Iran in that year produced 1,857 barrels. Venezuela started production on a large scale immediately after World War One, In that year total production in Venezuela amounted to 333 thousand barrels. Today Venezuela produces in the proximities of 787,384 thousand barrels.

The twenties were years of great expansion in most countries. More and more countries entered the field of oil production. By that time the world has come to depend more and more on oil. It was during the twenties that conversion from the use of coal to the use of oil started. The British

---

1. World Oil, Vol. 143, No.3, August 15, 1956, p. 148.

2. P.P.S., "World Production: New Peak", Vol. XXVIII, No.1, p.2, January 1956.

3. To convert into proximately tons, divide by 7.

Admiralty took the lead by making the British fleet use oil instead of coal. Countries became aware of the growing importance of oil, and began searching for oil supplies. Those who already possessed oil, began boosting up their production. Those who did not have the oil began prospecting for it either on their own soil or abread. A big era for oil prospecting and exploration was started worldwide.

A sad consequence of this rush for oil was that in the race for foreign oil concessions, the "Haves" came to dominate most or practically all the world's oil resources, resulting in a division of the world between the few "haves" and the many "have nots". Nevertheless, world production began to increase, and to increase at a rapid rate. From a total production of 149,137 thousand barrels (approximately 21 million tons) in 1900, world production rose to 688,884 thousand barrels (96.1 million tons) in 1920 or about five times more. World production continued to expand, until it took a geographical pattern in the thirties not very much dissimilar to that of teday. Despite the depression of the thirties, oil production continued to increase. The effect of the depression was that production was sustained at the level prevailing in the late twenties. After the thirties production began to shoot up until it reached a total of 2,594,697 thousand barrels (350 million tons) in 1945. Nothing however, has equalled the remarkable rise in output during the past ten years. During the five years following the end of World War II, the annual rate of production has risen by over 170 million tons a year to 523 million tons in 1950 (3,803,027 thousand barrels).

TABLE 14

WORLD PRODUCTION BY REGIONS - 1950-1956

(000, Metric Tons)

Region	1950		% increase over 1950	% of World Total	1952	% increase over 1951	% of World Total	1953	% increase over 1952	% of World Total	1954	% increase over 1953	% of World Total	1955	% increase over 1954	% of World Total	1956	% inc. over 1955	% of World Total
North America	274,819	315,500	14.6	53.2	318,000	1.7	51.4	328,300	3.5	50.2	324,460	- 1.2	47.6	349,800	7.6	45.9	374,447	6.3	44.8
South America	86,024	97,550	13.4	16.4	103,500	6.2	16.8	100,700	-2.4	15.4	106,550	5.5	15.6	120,050	11.9	15.8	139,350	14.5	16.7
Others (a)	16,337	17,025	4.3	2.9	17,440	0.9	2.8	17,650	1.9	2.7	19,716	15.4	0.9	20,950	8.6	2.7	22,130	6.2	2.7
Middle East	87,727	97,467	11.1	16.4	106,120	9,3	17.2	121,625	15.2	18.6	135,880	11.2	19.9	161,550	17.5	21.2	171,817	5.7	20.6
Far East	11,908	13,820	16.0	2.3	14,600	8.0	2.3	16,260	10.1	2.5	16,995	3.6	2.5	18,050	5.0	2.4	19,815	6.0	2.4
Western Europe	2,053	2,520	22.8	0.4	3,190 (b)	19.4 (b)	0.5 (b)	3,860 (b)	19.9 (b)	0.6 (b)	4,650 (b)	19.9 (b)	0.7 (b)	9,415 (b)	17.0 (b)	1.2 (b)	10,282 (b)	9.7 (b)	1.2 (b)
Eastern Europe	44,719	49,815	11.4	8.4	55,290	10.9	9.0	65,830	9.5	10.0	73,253	10.9	10.8	83,302	17.5	10.8	97,866	15.8	11.6
World Total	523,387	593,697	13.4	100.0	618,140	5.3	100.0	654,215	5.3	100.0	681,504	3.9	100.0	763,117	11.2	100.0	835,707	8.5	100.0

Source: Petroleum Press Service, Vols. XVIII, XIX, XX, XXI, XXII, XXIV.
Nos. 1, 1, 1, 1, 1, 2,
Years 1951, 1952, 1953, 1954, 1955, 1956.

(a) These countries include minor producing areas in South America, Mexico, Argentina, Peru, Ecuador, Chile, Bolivia, Brazil, Cuba.

(b) Includes Communist China.

III. Production in the Middle East

The history of oil development in the Middle East begins with the discovery of oil in 1869 in a location near Gemsa, south of the Gulf of Suez on the Red Sea coast. Production of oil in commercial quantities began in 1909. However, the Gemsa field proved to be a small one, but nevertheless attracted prospectors for Egypt's oil possibilities.

Meanwhile, the indications of the presence of oil deposits in the areas of Mesopotamia and Persia attracted attention to them. In 1908, the Masjid-i-Sulaiman field was discovered in Iran. Between 1909 and 1914 drilling in this field continued and this field proved to be a rich one. "The first oil shipment of Middle East oil was made in 1912."(1)

In Iraq, the first oil field was discovered in Baba Gurgur in the vicinity of Kirkuk on October 15, 1927, and "brought in one of the world's largest oil fields".(2) In Saudi Arabia, the Damman Field No. 7, drilled in 1936, yielded oil in commercial quantity in March 1938. "The first commercial oil shipment was made by barge from Al-Khobar to Bahrain the following September".(3) The first overseas tanker shipment from Ras Tanura was made on May 1, 1939. In Bahrain, oil in commercial quantity was discovered on May 31, 1932. In Kuwait, Oil was discovered in commercial

---

1. Arabian American Oil Company, Middle East Oil Development, New York, March 1956, p.20.
2. Ibid., p. 26.
3. Ibid., p. 31.

quantity in the Burgan area in April 1938. In Qatar, the first well, Dukhan No. 1, discovered oil in December 1939, but the first oil shipment was made from Umm Said in December 1949. In the Neutral Zone, the exploration well, Wafra No. 4 discovered oil in commercial quantity on March 24, 1953. Exports began on January 1954, when the first shipment was made from Mina Abdullah.

The world oil industry can claim to be almost a century old; the Middle East as a really large-scale producer counts a bare decade. In 1914, its output was no more than half a million tons, compared with the United States' output of 36 1/2 million tons and total world output of close on 56 million tons. By 1930 the Middle East output was up to 6 million tons (of a total of 200 millions), and by 1938 to 16 millions[1] (of 280 millions). Then between 1945 and 1955 output rose sixfold from 27 to 162 million tons.[2] That extraordinary expansion was about three times as fast as that in world oil output as a whole, and thus raised the Middle East's share in it from 7 to just over 20 per cent.[3] Middle East production has achieved this spectacular increase in the postwar ten years period.

---

1. Wilfred King, "Middle East Oil; Europe's Lifeblood," The Banker, November 1956, p.5.

2. Ibid.

3. Ibid.

"By the beginning of World War II, the oil industry was just getting its start in the Middle East, with the exception of Iran and Iraq."(1) Although important discoveries had been made by 1938, in most of the countries that today are the producing areas in the Middle East, commercial development was still at its early stages. The exception was Persia, when oil had been discovered thirty years before and where production by this date accounted for two thirds of the whole region's output.(2) After Persia came Iraq, which reached the full potential of its initial 12-inch pipelines by 1939. Further development of Middle East oil was interrupted by the war, and large scale development was virtually suspended for six years. Effort was therefore concentrated on the fields which were already in operation, and the Middle East annual output was raised from 16.2 million tons in 1938 to 35.5 million tons in 1946. Thus by the end of the war, the Middle East had increased its share of world total production from six per cent to ten per cent.(3) The main contributors to this figure were Persia, Iraq, and latterly, Saudi Arabia.

---

1. Middle East Oil Development, op.cit., p.1.
2. Iraq Petroleum Co. Ltd, Iraq Oil in 1955, (London, 1956), p. 20.
3. Ibid.

Since the end of World War II, the Middle East continued to forge ahead. In 1950 the three main producing areas which were Persia, Saudi Arabia and Kuwait, showed a spectacular increase, with output rising from four to five million tons during the year in each. The rise in Saudi Arabia was partly because of the opening of the Trans-Arabian Pipeline. This country's output showed an unparallelled increase from one million tons in 1944 to 27 million tons in 1950. "Kuwait's performance is however, hardly less remarkable.(1) With production starting only in 1946, by 1950 Kuwait has become the sixth biggest oil-producing country in the world.(2) Iraq was not still an important producer because production there was linked to pipeline facilities.

The Middle East scored an 11 per cent increase in its output in 1951 over 1950, and thus even making for the loss of oil from Persia. This increase has been achieved mainly by advances in Kuwait and Saudi Arabia which was hitherto the largest producer in the area. The level of output was equivalent to 44 million tons in Saudi Arabia in 1951, which was then the leading producers, and 36 million tons in Kuwait.(3)

---

1. P.P.S., "World Production: New Peak", Vol. XVIII, No. 1, p.4, January 1951

2. Ibid.

3. P.P.S., "Another World Production Record", Vol. XIX, No. 1, p. 2, January 1952.

Towards the end of 1952, the Middle East reached a production rate equivalent to well over 110 million tons a year, compared with about 105 million tons in the Caribbean Area.[1] In that year Middle East's output rose by 9.3 per cent (by nearly 25 million tons from 80.3 million tons in 1951 to 105.1 million tons in 1952) and was 17.2 per cent of world total output. This increase was made by an advance of 3 1/2 million tons in Saudi Arabia, over 9 millions in Kuwait, over 10 millions in Iraq, and 1 million tons in Qatar. The spectacular increase in Iraq's output is due to the opening of the 31-inch pipeline to the Mediterranean terminal at Banias.

"The outstanding development in crude oil production in recent years, and again in 1953 has been the continued rapid expansion of output in the Middle East, which at over 120 million tons is more than double what it was five years ago, even after the loss of the Persian output of 32 million tons a year."[2] Before the war, the whole Middle East, including Persia, produced 16 million tons or 7 per cent of the world's output, and being equivalent to less than 40 per cent of the Caribbean area output.[3] In 1953, even with the increased production elsewhere, the Middle East produced a little over 20 per cent of the world's output, and produced more than the whole of South America, and if the United States and the Communist countries are not accounted for, the Middle East produced

---

1. P.P.S., "Upward Climb of World Oil Production", Vol. XX, No. 1, p. 3, January 1953.

2. P.P.S., "World Production Again Higher", Vol.XXI, No. 1, p.2, January 1954.

3. Ibid.

then more than 45 per cent of the Free World's total crude output of 1953's increase of over 16 million tons in putput over 5 million tons came from Kuwait, over 9 million tons from Iraq, and nearly 1 million tons came from Qatar.(1) Kuwait this year, was the highest producer in the region. The marked increase in Iraq's output of 9 million tons was chiefly the result of the new pipeline system to Banias.

The year 1954, marked the coming back of Persia into the picture of oil production. Output continued to soar up reaching a record of 136 million tons. In this year, 1954, Kuwait still held the title of the region's largest producer, with an output of 47 million tons or 3.7 million tons more than in 1953.(2) Saudi Arabia's output was very close to that of Kuwait, with an output of 46 million tons or 4.6 million tons more than in 1953. Iraq's production was not more than 8 million tons in 1951, but has jumped up to 31 million tons in 1954, thanks to the new pipeline systems both on the Mediterranean, and on the Persian Gulf. Qatar, which started production only five years ago, has reached a total output of over five million tons in 1954. Bahrain's production has not surpassed the level of 1 1/2 million tons since 1948. This year marked the addition of another Arab oil producing region. The Kuwait neutral zone has started production, and the first export shipment was made in January and production totaled more than 3/4 million tons.(3)

---

1. Ibid., p. 3.

2. P.P.S., "Ascending World Production", Vol. XXII, No. 1, p.3, January 1955.

3. Ibid.

Persia was quickly regaining its share in Middle East output. In 1955, about half of the year's increase in the Middle East was due to the increase in Persian production. (Total increase in Middle East output 24 million tons). Nevertheless production in the Arab Middle East countries continued to rise. Kuwait's production rose by more than 7 million tons compared with an increase of 4 1/2 million tons in 1954 and the country still remains the region's largest producers, with Saudi Arabia second to it. Qatar's production approached the rate of 1 1/2 million tons while production only started one year hence.

Last year, production in the Middle East was temporarily hindered because of the Suez Crisis. Production was planned to reach 190 million tons, but with the occurrence of the Suez Canal crisis, production was severely cut down in the months of November and December and output reached only 172 million tons, with only 5.7 increase over 1956, and with a 20% share of world output as compared to 21.2 per cent in 1955.(1) This has brought output in the Middle East back to the 1952 level. Kuwait's production which reached a yearly rate of 60 million tons before the Suez crisis, has fallen to about 35 million tons. Similarly, Saudi Arabia's output fell from a rate of 50 million tons a year to half that amount after the crisis. But Iraq was the most hit by the crisis, with production falling from a rate of 26 million tons a year from Kirkuk to 1 1/4 million tons a year. This severe blow to Iraqi production

---

1. P.P.S., "World Production in 1956", Vol. XXIV, No. 2, p. 45, February 1957.

is due to the complete dependence of Kirkuk oil on pipeline facilities to the Mediterranean. Persia was the least to be affected by the crisis since its oil is marketed mainly East of Suez. There was, however, no drastic cut in the output of Qatar and Bahrain, but that of the Neutral Zone was cut by one half.(1)

Now, with conditions coming back to normal it is expected that the Middle East's share in total output will continue to increase. Since 1946 production has nearly doubled in the free world as a whole, the increase having been over 360 per cent in the Middle East, about 100 per cent in Venezuela and 40 per cent in the U.S.A.(2) "If political factors do not impede the flow, the scope for the expansion of oil extraction in the Middle East will be immense."(3) Serious prospecting has still covered only a relatively small part of this vast oil-bearing area. But the significance of the Middle East in the world oil balance is even greater than the figures suggest. The pace of growth of Middle East output is quickning year by year. Moreover, (as we shall see later the importance of Middle East Reserves), it is estimated that the current rate of Middle East production is annually absorbing a mere 1 per cent of reserves already proved to be

---

1. Ibid.
2. P.P.S., op.cit., p. 2, January 1955.
3. W. King, op.cit., p.4.

economically available.[1] Just over 3/5 of both the current oil production and the proved reserves of the Middle East are boosted by two states, Kuwait and Saudi Arabia. In 1938, nearly two-thirds of total Middle East output came from Iran, and practically all the rest from Iraq; last year, Iran's output, resumed though not fully restored after the settlement of the 1951 dispute, represented only 10 per cent, and Iraq's 2 per cent. "By far the largest part of the great rise in Middle East output has thus come from discoveries rather than from intensive working of existing fields."[1] The Middle East, as we are going to see later, has greater and wider horizons in the world's oil production. The possibilities opened up by undersea drilling, not to mention those raised by the new territorial discoveries, could conceivably involve a change in the balance of oil production in the Middle East "in the next decade as radical as that of the past decade".[2] But however uncertain the future pattern of the Middle East oil industry, it is reasonable to be confident about the future level of total output given, of course, the necessary political atmosphere.

---

1. Ibid.
2. Ibid.

TABLE XV

MIDDLE EAST OIL IN WORLD PERSPECTIVE 1914-1955

(Percent of World Output)

	1914	1930	1938	1947	1955
Middle East	.9	3.2	6.	9.7	20.4
United States	65.1	63.4	62.9	62.3	45.6
Latin America	7.2	16.8	13.3	19.2	16.3
Russia	16.5	9.5	11.1	6.3	8.8
Other	10.3	10.1	6.7	2.5	8.9
Total	100.	100.	100.	100.	100.

SOURCE: The Banker, op.cit., p. 15

TABLE 16

WORLD PETROLEUM DEMAND AND SUPPLY BY REGIONS, FOR YEAR 1946

(Barrels Per Day)

REGION	Domestic Demand	DOMESTIC SUPPLY			Excess Supply Over Demand	Excess Demand Over Supply	Percent of World	
		Crude Oil	Natural Gasoline Etc.	Total			Domestic Demand	Domestic Supply
North America	5,352,000	4,906,900	320,200	5,227,100	.....	124,900	68.8	65.9
United States	4,912,000	4,750,500	317,000	5,067,500	155,500	.....	63.2	63.9
Canada	221,500	21,000	1,200	22,200	.....	199,300	2.8	0.3
Other North America	218,500	135,400	2,000	137,400	.....	81,100	2.8	1.7
South America	377,200	1,275,700	7,600	1,283,300	906,300	.....	4.8	16.2
Venezuela	24,400	1,064,300	500	1,064,800	1,040,400	.....	0.3	13.4
Other Caribbean Area	129,200	113,200	3,800	117,000	.....	12,200	1.6	1.5
Other South America	223,600	98,200	3,300	101,500	.....	121,100	2.9	1.3
Europe excl. U.S.S.R.	808,300	136,400	46,200	182,600	.....	625,700	10.4	2.3
U.S.S.R.	514,700	438,200	9,000	447,200	.....	67,500	6.6	5.7
Africa	160,000	24,500	.....	24,500	.....	135,500	2.1	0.3
Middle East	145,000	690,400	.....	690,400	545,400	.....	1.9	8.7
Far East, Oceania	420,700	67,400	4,200	71,600	.....	349,100	5.4	0.9
TOTAL WORLD	7,777,900	7,539,500	387,200	7,926,700	148,800	.....	100.0	100.0

Source:World Oil op.cit., p. 145.

TABLE 17

PETROLEUM DEMAND AND SUPPLY BY AREAS, 1947 & 1949

(in thousand of barrels daily)

Country	Domestic Demand	Domestic Supply	Excess of Supply over demand	Excess of Demand over supply	Percent of World Supply	
					Domestic Demand	Domestic Supply
1949						
U.S.	5,792.4	5,470.4	-	322.0	59.42	55.70
Other North America	478.2	232.2	-	246.0	4.91	2.36
Total North America	6,270.6	5,702.6	-	568.0	64.33	58.06
Caribbean Area	212.9	1,464.1	1,251.2	-	2.18	14.91
Other South America	397.5	117.8	-	279.7	4.08	1.20
Total South America	610.4	1,581.9	971.5	-	6.26	16.11
Europe (Excluding U.S.S.R.)	1,226.7	176.2	-	1,050.5	12.59	1.79
Africa	236.8	44.5	-	192.3	2.43	.45
Middle East	211.8	1,402.9	1,191.1	-	2.17	14.29
Far East and Australia	484.0	205.7	-	278.3	4.97	2.10
Total World	9,040.3	9,113.8	73.5	-	92.75	92.80
1947						
U.S.	5,449.2	5,449.2	-	-	62.36	62.62
Other North America	487.3	176.8	-	310.5	5.58	2.03
Total North America	5,936.5	5,626.0	-	310.5	67.94	64.65
Caribbean Area	181.6	1,318.4	1,136.8	-	2.08	15.15
Other South America	262.3	106.0	-	156.3	3.00	1.22
Total South America	443.9	1,424.4	980.5	-	5.08	16.37
Europe (Excluding U.S.S.R.)	1,010.6	161.9	-	848.7	11.57	1.86
Africa	180.3	26.5	-	153.8	2.06	.30
Middle East	168.8	840.3	671.5	-	1.93	9.66
Far East and Australia	419.5	70.5	-	349.0	4.80	.81
Total World	8,159.6	8,149.6	-	10.0	93.38	93.65

Source: International Petroleum Cartel, op.cit., p. 13.

TABLE 18

WORLD DEMAND & SUPPLY OF CRUDE OIL, 1950-1954

(in thousands of barrels per day)

		North America	South America	Europe (incl. USSR)	Africa	Middle East	Far East & Oceania	World Total
1950	Demand	7,023	695	2,210	276	250	514	10,968
	Supply	6,182	1,758	982	47	1,743	249	10,961
	Diff. ±	- 841	+ 1,063	- 1,228	- 229	+ 1,493	- 265	- 7
1951	Demand	7,634	762	2,531	337	255	629	12,148
	Supply	7,068	2,006	1,127	48	1,928	280	12,458
	Diff. ±	- 566	+ 1,244	- 1,404	- 289	+ 1,673	- 349	+ 310
1952	Demand	7,944	820	2,742	345	241	674	12,766
	Supply	7,253	2,112	1,250	50	2,084	304	13,053
	Diff. ±	- 691	1,292	1,492	- 295	+ 1,843	- 370	+ 287
1953	Demand	8,356	839	2,998	358	262	768	13,581
	Supply	7,558	2,091	1,428	52	2,424	339	13,892
	Diff. ±	- 798	+ 1,252	- 1,570	- 306	+ 2,162	- 429	+ 311
1954	Demand	---------- not available ----------						
	Supply							
	Diff. ±							

Source: Oil Forum November 1955.

TABLE 19

WORLD PETROLEUM DEMAND AND SUPPLY, BY REGIONS, FOR YEAR 1954

(Barrels per Day)

REGION	Domestic Demand	DOMESTIC SUPPLY			Excess Supply Over Demand	Excess Demand Over Supply	Percent of World	
		Crude Oil	Natural Gasoline Etc.	Total			Domestic Demand	Domestic Supply
North America	8,538,500	6,834,800	700,400	7,535,200	.....	1,003,300	59.1	51.7
United States	7,760,000	6,342,400	692,000	7,034,400	.....	725,600	53.7	48.3
Canada	558,900	263,200	4,200	267,400	.....	291,500	3.9	1.8
Other North America	219,600	229,200	4,200	233,400	13,800	.....	1.5	1.6
South America	913,700	2,218,400	21,600	2,240,000	1,326,300	.....	6.3	15.4
Venezuela	107,100	1,896,300	5,400	1,901,700	1,794,600	.....	0.7	13.1
Other Caribbean Area	175,400	173,400	8,000	181,400	6,000	.....	1.2	1.2
Other South America	631,200	148,700	8,200	156,900	.....	474,300	4.4	1.1
Europe excl.U.S.S.R.	2,278,400	375,800	83,000	458,800	.....	1,819,600	15.7	3.2
U.S.S.R.	1,181,000	1,137,000	48,000	1,185,000	4,000	.....	8.2	8.1
Africa	387,100	41,700	2,400	44,100	.....	343,000	2.7	0.3
Middle East	288,000	2,740,700	.....	2,740,700	2,452,700	.....	2.0	18.8
Far East, Oceania	867,300	357,800	5,000	362,800	.....	504,500	6.0	2.5
TOTAL WORLD	14,454,000	13,706,200	860,400	14,566,600	112,600	.....	100.0	100.0

Source: World Oil op.cit., p. 145.

WORLD PETROLEUM DEMAND AND SUPPLY, BY REGIONS, FOR YEAR 1955

(Barrels per Day)

REGION	Domestic Demand	DOMESTIC SUPPLY			Excess Supply Over Demand	Excess Demand Over Supply	Percent of World	
		Crude Oil	Natural Gasoline Etc.	Total			Domestic Demand	Domestic Supply
North America	9,276,900	7,406,600	740,100	8,146,700	.....	1,130,200	57.7	50.1
United States	8,416,000	6,807,000	725,000	7,532,000	.....	884,000	52.4	46.3
Canada	621,000	354,700	10,500	365,200	.....	255,800	3.8	2.3
Other North America	239,900	244,900	4,600	249,500	9,600	.....	1.5	1.5
South America	1,006,900	2,494,500	21,600	2,516,100	1,509,200	.....	6.3	15.5
Venezuela	127,400	2,157,900	6,000	2,163,900	2,036,500	.....	0.8	13.3
Other Caribbean Area	183,000	175,900	6,400	182,300	.....	700	1.2	1.1
Other South America	696,500	160,700	9,200	169,900	.....	526,600	4.3	1.1
Europe excl. U.S.S.R.	2,670,800	430,700	96,400	527,100	.....	2,143,700	16.6	3.2
U.S.S.R.	1,368,000	1,340,000	50,000	1,390,000	22,000	.....	8.5	8.5
Africa	425,900	38,100	4,000	42,100	.....	383,800	2.7	0.3
Middle East	349,500	3,250,400	.....	3,250,400	2,900,900	.....	2.2	20.0
Far East, Oceania	971,000	390,900	5,000	395,900	.....	575,100	6.0	2.4
TOTAL WORLD	16,069,000	15,351,200	917,100	16,268,300	199,300	.....	100.0	100.0

Source: World Oil Ibid.

IV. World Demand and Supply

Last year world demand for oil increased by 11 per cent. With minor fluctuations, requirements have continued to rise at the rate of between six and seven per cent over the past 60 years and there is every reason to believe that this rate will be maintained, and even increased in the years to come. The world is consuming oil at a rapid rate. On the other hand, production is increasing. How does the demand for oil match the supply of oil?

When we compare figures of supply and demand today, one surprisingly finds that the only two surplus areas in the world are Venezuela and the Middle East, and the rest of the free world including the United States is in deficit. Since 1949, the Middle East and the Caribbean area had a level of production by far in excess of their level of consumption. "Just as there is uneven distribution of oil there is uneven consumption",(1) luckily enough for the have-nots. There has been established a pattern of production and consumption. However, this pattern is a changing one. Some countries produce and others consume. "This means that consuming areas depend upon the surplus of the producing areas".(2) Though simple as it seems, this phrase is of utmost importance. Just what would happen to the consuming areas when the producing areas

---

1. U.S. Senate, Federal Trade Commission, International Petroleum Cartel, 82nd Congress, (Washington 1952), p. 17.

2. Ibid.

use that oil to satisfy their increased consumption, when they transform from economically backward areas to fully developed and prosperous areas? "It is a blessing for the industrialized countries of the West to have most of the crude producing countries such as the Middle East, Non-industrialized."(1)

The areas that depend upon the surplus of the Middle East and Venezuela are, Africa, the Far East, parts of North and South America, and especially Europe. One of the important features of post-war developments in demand and supply is the turning of United States from being a net exporter to a net importer of oil. In 1947, the United States supply just matched domestic demand. In 1949, the United States has become a deficit country, and consumption exceeded domestic supply and demand by 322 thousand barrels daily. By 1955 the gap between domestic supply and demand has grown to a total deficit of 884,000 barrels daily, or nearly two and half times bigger. The United States is no longer the country with ample oil resources and the rich oil fields, and is no longer the saviour in emergencies. It has simply become a deficit and a poor area in oil, just as the rest of the western world is.

The key factors in world supply keeping up with rapidly rising demand during recent years have been Venezuela and the Middle East - the production from these two areas helped make it possible for world consumption to

---

1. Ibid.

reach 16,069,000 barrels per day in 1955, 11/3 million barrels more than in 1954, and more than twice the 7,777,900 barrels of oil consumed daily throughout the world in 1946 (See tables 16 - 20).

Total world supply of crude oil and natural gas liquids have more than doubled in the past ten years. Production has increased from 7,926,700 barrels per day in 1946 to 16,268,300 barrels per day in 1955.

Despite the rapid increase in consumption, excess of supply over demand totalled 199,300 barrels per day in 1955, compared with 148,800 barrels per day in 1946.

Venezuela and the Middle East alone produced 5,414,300 barrels of oil per day in 1955, while consuming only 476,900 barrels per day. This excess of 4,937,400 barrels of daily production accounted for 30.3 per cent of the world's oil supply last year. This compared with 1946 when surplus production from the two areas totalled only 19.9 per cent of the total supply.

Venezuela produced 2 million barrels of oil per day more than it consumed in 1955, double its surplus of 1 million barrels daily in 1946. The Middle East produced almost 3 million more barrels of oil per day than it consumed in 1955 for a total increase of 5 1/2 times its 1946 production of 545,000 barrels daily. The Middle East's surplus production totalled 17.8 per cent of the world supply in 1946.

On the debit side, Europe (excluding the USSR) and North America are the two major oil short areas of the

world.

The ten-year trend toward increased demand over supply for both areas hit a new peak in 1955; i.e., Europe consumed 2,143,700 barrels of oil per day (13.4 per cent) more than it produced. North America's consumption rate was 1,130,000 barrels per day (7.6 per cent) over the total supply. This is a sharp increase over 1946 when North America consumed only 124,900 barrels per day (2.9 per cent) more than it produced - and Europe consumed 625,700 barrels per day (8.1 per cent) more than its supply.

Since 1946, the U.S. supply demand ratio has shown a most reached change. The U.S. has reversed from a surplus producer to a decided surplus consumer. In 1955 the U.S. produced 7,532,000 barrels of oil per day. At the same time it was consuming oil at a daily rate of 8,416,000 barrels per day - for an excess daily consumption rate of 884,000 barrels (6.1 per cent) over domestic supply. This compares with an excess consumption of 725,600 barrels per day (5.4 per cent) over supply in 1954. In contrast, the U.S. produced 155,550 barrels per day 10.7 per cent) more than it consumed in 1946.

Due to rapid growth elsewhere, the U.S. is accounting for a smaller portion of the world's oil consumption and supply every year. In 1946 the U.S. used 63.2 per cent of the world's consumption. Although showing big gains in consumption, the U.S., in 1955, used but 52.4 per cent of total world demand - 10.8 per cent less than in 1946. U.S. supremacy in world production has decreased at an even faster rate.

V. The Role of Middle Eastern Oil Supplies

A. Oil Reserves

How can the deficit areas in the world be assured that the world will continue to yield this precious commodity in the ever-increasing quantities required? This brings up the question of oil reserves in the world.

Consideration of the oil reserves in the world demands two calculations: first, an estimate of "proven" reserves, which decrease according to the quantity of oil produced, but which are constantly being increased with the discovery of new fields and revised estimates in known fields; second, by endeavouring to estimate "possible" reserves, the total amount of oil still remaining in the earth. By the end of 1955 oil reserves in the world were estimated at 306 billion barrels, of which 230 billion barrels are in the Middle East.

TABLE XXI

OIL RESERVES IN THE WORLD 1955

(Billions of Barrels).

COUNTRY	BARRELS	PERCENT	
U.S.A.	35	11.44	
Others North America	7	2.29	
South America	27	8.82	
Total Western Hemisphere	69		22.55
Western Europe	1	0.33	
Oceania and Far East	6	1.96	
Middle East	230	75.16	
Total Eastern Hemisphere	237		77.45
Total World Reserves	306		100.00

SOURCE: Pratt, W., Peaceful Uses of Atomic Energy, op.cit., p. 93.

These figures indicate conclusively that the world as a whole will become more and more economically dependent on the Middle East, where 75 per cent of total oil reserves are estimated to lie...As an indispensable partner in the life of the peoples of the earth, the Middle East can therefore look forward to playing a part of increasing importance in the progress and economic stability of mankind. Moreover, "the estimates of proved resources in the Middle East are considerably larger than recently published figures. Nevertheless, they are believed to be conservative by several well-informed and experienced operators in the Middle East."(1)

B. Growth of Middle East Oil Reserves.

The importance of the Middle East's oil reserves have been a recent phenomena and we are only beginning to recognize their significance.

At the start of World War II, proved reserves of the Middle East were estimated at 6 billion barrels, one third of the U.S. total.(2) By 1952, they shot up elevenfold to 65 billion barrels - more than twice the U.S. total (then 28 billion). In three years, by 1955, published proved reserves doubled again, to over 125 billion barrels - or four times the U.S. total.(3) However, these estimates

---

1. Pratt, W., Peaceful Uses of Atomic Energy," op.cit., p. 94.

2. W.M. Jablonski, "Middle East Oil, America's Stake in the Middle East", Petroleum Week, May 25, 1956.

3. Ibid.

are short of the real reserves of the area. Last year, an eminent authority, Wallace Pratt, retired vice-president of Standard Oil Company (N.J.), revealed in a special study for the U.S. government that proved reserves in the Middle East, conservatively estimated, totalled 230 billion barrels at the end of 1954.(1) This figure is seven times that of the U.S. (now 30 billion barrels). It is more than three quarters of the world's existing reserves. (taking USSR, it becomes 70%). "The Middle East may easily hold 80% or 90% of the free world's reserves".(2) "The geological features favoring vast accumulations of oil in the Middle East are unique and no other area is expected to rival it as the major future source of oil supply for the world."(3) The yield per well, the size of the individual field, the richness of the zone, are incomparable. Only 1500 wells have been drilled in search of oil in the Middle East compared with more than a 1000 times as many in the U.S.(4) "Over 13,000 barrels of oil have been proved per foot drilled in the Middle East, compared with between 20 and 30 barrels in the U.S.A., and between 600 and 700 barrels in Venezuela."(5)

---

1. Ibid.
2. Ibid.
3. P.P.S., "The Incomparable Middle East," Vol. XXIII, No. 7, p. 239, July 1956.
4. Ibid.
5. Ibid.

The oil fields zone of the Middle East is the biggest in the world with a total length of 1,200 miles and a width of about 500 miles, extending from the Taurus and Zagros mountains to South Western Arabia, and occupying some 600,000 square miles. So far, 35 oil fields have been discovered in the Middle East of which 21 are already producing oil.

The biggest two fields in existence now according to proved reserves are the 140 mile Ghawar field in Saudi Arabia - the largest in the world, and the Burgan field in Kuwait. In only eleven fields lie over 90 per cent of the proved reserves of the Middle East.(1)

If only eleven fields have yielded such a magic figure of proved reserves, then what about future discoveries? "Dazzled by the richness of the resources discovered, one forgets how late, owing to its distance from industrial consuming centres, and how unintensively the vast areas of the Middle East have been explored."(2) The Middle East already contains three quarters of the world's proved reserves, "and many experts are confident that before long they will be doubled by further search and technical advance." "The Middle East will be in the far, as in the near, future for the decisive reason of sheer quantity of oil, the principal crude oil supplier to the world."(3)

---

1. Ibid.
2. W. King, op.cit., p. 6.
3. Ibid.

C. Production VS Reserves

While the United States has produced up to nearly half its oil, the Middle East has produced only seven per cent of the huge quantities of oil found in it. If the Middle East's proved reserves are added to past production, the region has so far provided more discovered oil than the whole of North America.(1) The Middle East can meet the whole world's demand for oil without drawing much more than one per cent annually from its existing proved reserves.(2) The Middle East pools, in short, are now believed to hold more than three quarters of the world's known reserves, Less than 7 per cent of Middle East's oil reserves have been removed from the ground. By contrast, the United States, with about 10 per cent of the known reserves, is estimated to have used up perhaps as much as 60% of the proved oil under its surface.(3)

---

1. Ibid.

2. Ibid.

3. Charles J.V. Murphy, "Oil East of Suez and Nasser's Dreams," Life, Vol. 21, No. 10, p. 82, November 12, 1956.

TABLE XXII

RESERVES VS PRODUCTION IN THE FREE WORLD - 1955

(Percentage of World Production)

COUNTRY	RESERVES	PRODUCTION
North America	19.1	54.3
South America	7.6	18.1
W. Europe and Africa	0.8	1.4
Middle East	70.7	23.4
Far East	1.7	2.8
Others		

SOURCE: Middle East Oil Development, p.22.

Moreover, it is estimated that the current rate of Middle East production is annually absorbing a mere one per cent of reserves already proved to be economically available while the comparable figures for the United States and Venezuela are 8 per cent and 7 per cent respectively. "Despite the steep rise in oil production that took place in the post-war period, the present level of output in the Middle East is far below production capacity. The great disparity between the levels of reserves and production is also evident from the fact that whereas the United States is using up its proved oil reserves at an annual rate of 1:13 and Venezuela at a rate of 1:16, the rate of the Middle East as

a whole is 1:100.[1] It was estimated, that at the present rate of production, the United States will deplete its oil reserves in about thirteen years. "Whatever the figure that may be put to the Middle East's resources, it is head and shoulders above other existing pro ducing regions and the combination of geological circumstances found in the Middle East make it appear unlikely that any other area will ever achieve a comparable position."[2]

VI. Middle East Oil in World Perspective

The special importance of the Middle East lies in the emergence of its amazing potential during this period in which the demand for oil, especially Europe, is expanding abnormally fast, while the demand of the United States is running progressively further ahead of its output. "Today, the role of the Middle East as an oil producer is as the major supplier to Europe and the whole eastern hemisphere and a marginal supplier to the United States. But in coming decades, so far as can be seen, dependence on the Middle East is likely to be immeasurably greater."[3]

---

1. S. Yari, op.cit., p.
2. P.P.S., op.cit., p. 242.
3. W. King, op.cit., p. 6.

The United States production had accounted for between 60 and 65 per cent of the world's total output.[1] However, the greatest portion of that output was to meet domestic consumption, which was growing at an ever rapidly increasing rate. The U.S. was a net exporter of oil, and its oil exports, though small compared with its inland consumption, nevertheless, they formed a significant share in the world trade.

After the war, however, the United States became a net importer of oil on a progressively increasing scale, notwithstanding the continued increase in its production. Between 1947 and 1955 this increase lagged behind output in other areas, so the U.S. share dropped from 62 to 45 per cent of the total, and behind American consumption, so that the excess of U.S. oil imports over exports rose from 7 to 43 million tons in 1955.[2]

The participation of the Middle East in supplying America's oil deficiency has been relatively small - though it has grown substantially in the last few years. Venezuela has helped to fill up the gap by its exports to the United States.

The astronomical increase in the demand for oil in Western Europe thus had to be satisfied from new sources, and preferably sources that did not involve large outlays in dollars. The Middle East was the only major source; its

---

1. Ibid.
2. Ibid.

output rose from 42 million tons in 1947 to 162 1/2 million tons in 1955.(1) In this period oil consumption in Western Europe rose from 37 to 100 million tons, and the throughput of their refineries from less than 20 to 103 million tons. Gross imports rose from 37 to 128 million tons; while the proportion imported from the Middle East rose from 32 per cent to 77 per cent.(2)

The Middle East has, however, a greater and more important role in meeting the world's mounting future requirements of oil. In a recent study prepared by the Petroleum Department of the Chase Manhattan Bank, it was predicted that the world demand will rise in 1965 from 14,280 barrels daily to a fabulous figure of 24,800 barrels daily, which marks a 73.7 per cent increase above the present level of demand.

TABLE XXIII

PLAUSIBLE FREE WORLD PETROLEUM DEMAND
(Years 1960-1965)
(Thousand barrels Daily)

Area	1955	1960	1965	% change 1965
United States	8,380	10,300	12,800	52.7
Other countries	5,900	8,400	12,000	103.4
Total Free World	14,280	18,700	24,800	* 73.7

SOURCE: E. Pogue and K. Hill, Future Growth and Financial Requirements of the World Petroleum Industry by The Chase Manhattan Bank, New York, February 21, 1956, p. 16.

1. Ibid.
2. C. Murphy, op.cit., p. 82.

On the supply side, United State's production will not exceed 10 million barrels a day in 1965, with an excess of total requirements over domestic supply of 3.2 million barrels daily.(1) However, production in the free foreign world will double to a level of 14.7 million b/d thus providing sufficient supply to meet the increased demand. However, production in the rest of the Free World has limiting factors. Production in the United States has

TABLE XXV

ESTIMATED FREE WORLD PETROLEUM SUPPLY
(Thousand Barrels Daily)

Area	1955	1965	% change 1965 from 1955
US	7,495	9,870	31.7
Rest of Free World	6,830	14,680	114.9
Total Free World	14,325	24,550	71.4

Source: E. Pouge and K. Hill, op.cit.,p.23.

already passed the point of diminishing returns. In the Middle East, the limiting factor is not availability, but rather marketing and transportation. In the future the Middle East will be the principal supplier of the world's oil needs. Already Middle East production has increased fivefold since 1945 in order to meet the surging needs of the free world. In 1955 shipments alone rose 20%. "Yet

1. Jablonski, op.cit., p. 6.

nearly three times as much oil will be needed from the Middle East in less than a decade".[1] According to the Chase Manhattan Bank's study, the free world will be drawing around 8.5 million b/d from the Middle East, which is larger than the whole U.S. output today. "The Middle East therefore, becomes the balancing factor for equating world supply and demand, and large increase in the output of that sector is indicated during the next decade."[2]

The only two major producing areas in the Free World outside the Middle East are Venezuela and the U.S. Although Canada is growing fast, but its entire daily output is equal to one hour of U.S. consumption. Venezuela's output is wholly absorbed by the Western Hemisphere and production there is coming close to full capacity". Latin America is already drawing on Middle East Oil to meet its current needs, and its requirements will be more than twice as big in 1965."[3]

As for the United States we have seen that it can no longer supply the rest of the world. "True, before the war we were the world's prime oil exporter and when the Allies floated to victory on a sea of oil it was on our supply".[4] However, the picture has changed now, the Allies plus the United States will have to float to victory on a sea of oil from the Middle East, the United States, "production will be hard put to match the rate of gain of

---

1. E. Pogue and K. Hill, op.cit., pp.17,28.
2. Jablonski, op.cit.
3. Ibid.

consumption even with maximum drilling."[1]

The Chase Manhattan Bank's estimates are however, conservative, compared with another projection by a British Petroleum official Daniel C. Ion. However, all estimates made about demand forecasts have been conservative. "It is obvious that investigators in general have been influenced by a bias toward concercratism, if not with conservatism."[2]

Ion, presented the s till more startling forecast of a demand reaching 26 million barrels a day by 1965 and 40 million barrels by 1975.[3] Ion estimates that during the next two decades Middle East output will soon be about 18 million barrels a day, or six times what it now is.[4]

By far the most powerful simple factor at work in the future development of Middle East is to meet European demand. Experts of the Organization for European Economic Cooperation (OEEC) foresee an increase in the energy demands of the OEEC countries between now and 1975 that will compound at the rate of 2.5% annually.[5] Coal and

---

1. Ibid.
2. E. Pogue and K. Hill, op.cit., p. 7.
3. C. Murphy, op.cit., p. 83.
4. Ibid.
5. P.P.S., "Assessment of Europe's Energy Needs", Vol. XXIII, No. 7, p. 255, July 1956.

atomic energy are expected to furnish little help. By 1960 the area will have to import the equivalent of 195 million tons of coal and by 1975 440 million tons.[1] "The widening gap must be filled by oil and most desirably by oil from the Middle East",[2] since much of Europe's requirements will not require hard currency expenditures. Europe's mounting needs will raise Europe's imports from 2 million b/d in 1955 to 3 million b/d in 1960 and to 6 million b/d in 1975.

VII. Middle East Oil and Consuming Markets

In order to appreciate the importance of Middle East oil, we must get a clear picture of the relation of the Middle East oil to the consuming markets of the world. From a geographical point of view, the Middle East is supreme as a source of supply for the countries of the Far East and South Africa. These countries constitute a potential huge market, with their huge population. Today most of these countries are not yet developed, but are on the verge of economic development. With the development and industrialization of these countries, Middle East Oil will be provided with a huge market. "Though there are substantial volumes of oil in Indonesia and oil has recently been discovered in Australia, the maximum production from these Far Eastern sources is totally inadequate to supply the hundreds of millions of people in the Orient and so the Middle East is an essential source of oil supply for them."[3]

---

1. Ibid., p. 256.
2. C. Murphy, op.cit., p. 83.
3. Ibid.

By far, Western Europe constitute the largest consumption market for Middle East oil. This is so because of its advanced stage of industrial development. Although geographically Middle Eastern oil is equally competitive with oil from the Western Hemisphere but due to some considerations, it has replaced Western Hemisphere's oil as a source of supply. One reason is that Western Hemisphere oil is being absorbed by the soaring needs of the area itself. "In fact taking the long view, there are strong indications that the Western Hemisphere will have to draw increasingly from the East to fully meet its oil requirements."(1) The other reason is the desire of Europe to save hard currency, for Western Hemisphere oil is almost entirely a dollar oil, while Middle East oil is mostly a soft currency oil.

The Western Hemisphere comprises another potential market for Middle East oil. Already Middle East oil is reaching the U.S. and South America and with the mounting needs of this area, Middle East oil will play a relatively more important role in supplying the oil needs of this area.

---

1. Ibid.

CHAPTER V

MIDDLE EASTERN OIL AND WESTERN EUROPE

I. Oil Consumption In Western Europe

By far, Western Europe is the largest single consumer of Middle Eastern oil, and our oil has played a relatively important rôle in the post-war recovery of Western Europe. In order to appreciate the importance of Middle East oil, we should, therefore, examine how Western Europe came to depend more and more on our oil, and how this oil has become its "life blood".

The substantial increase in oil consumption in Western Europe has been a feature of the post-war economy of Western Europe. Since the war, Europe's oil needs, for industrial power, transportation, military use, have nearly quadrupled. Consumption of oil products in Western Europe rose from a total of 27 million tons in 1938 to 100 million tons in 1955 (700 million bbl.)

In a recent published report by the O.EE.C. Oil Committee, it was shown that since 1948, Western Europe's consumption of oil products has grown at an annual cumulative rate of 14 per cent.[1] This rate of growth is by

---

1. P.P.S., "Features of Europe's Mounting Needs", Vol. XXIII, No. 10, p. 359, October 1956.

far larger than the rate of growth of energy consumption, of 5 per cent annually, and the rate of increase in production of 8 per cent annually, for the area over the same span of time. Though Western Europe is still dependent on coal as a source of energy, the share of oil is rapidly increasing and has jumped from 8 per cent in 1938 to 11 per cent in 1949 and to 18 per cent in 1955. However, in the light of the coal shortage in Europe, oil's share will still continue to grow at this rapid rate.

This tremendous rise in Europe's consumption after the war is attributable to four main causes: the accelerated increase in industrial output and national incomes; mechanization, especially of agriculture; the decline in output of coal, and the major expansion in refinery construction. These four factors combined to accelerate the increase in oil consumption.

As for the future aspects of Western Europe's oil consumption, it was estimated by the O.E.E.C. oil committee that consumption will increase by 53 million tons over the next five years (by 1960), and will double by 1975, reaching a total of 310 million tons.(1) "Yet the Oil Committee believes that its estimates are likely to err on the side of conservatism".(2) Compared with the previous rate of

---

1. Ibid.

2. W. King, The Banker, op.cit., p. 20.

increase of 14 per cent", the projected rate for the period 1955-60 is about 8 per cent and that between 1960 and 1975 6 per cent."[1] Europe, by far, has the world's most rapidly increasing rate of petroleum consumption.

A. The Degree of Dependence of Western Europe's On Oil

1. Who uses most of the oil in Western Europe?

On a global basis, the U.K. is the largest consumer of oil in Western Europe. Next to it comes France, and then Italy, Western Germany, and Sweden respectively. However, such an evaluation would not give an important picture of the role of oil in each of Western Europe's countries. More significant in this respect are the consumption per head figures, and the contribution of oil to total energy requirements, in each of Europe's major oil consuming countries.

TABLE -26-

OIL CONSUMPTION IN WESTERN EUROPE

COUNTRY	CONSUMPTION/HEAD (KLGS) 1948	1955	OIL CONSUMPTION AS % OF TOTAL ENERGY 1955
U.K.	251	419	13
West Germany	42	194	9
France	145	357	20
Belgium	167	434	16
Sweden	431	1113	44
OEEC AVERAGE	133	302	18

SOURCE: The Banker, November 1956 and Economist, November 24, 1956.

1. Ibid.

It is noteworthy that consumption per head for the whole O.E.E.C. area has more than doubled over the period between 1948 and 1955. However, the largest increase has been recorded in Sweden where consumption per head jumped from 431 klgs. of oil products in 1948 to 1,113 klgs. in 1955. The U.K., though Europe's large oil consumer, has one klgs. of the lowest consumption per head ratio.

As to the contribution of oil to total energy requirements, Sweden has the highest ratio among the O.E.E.C. countries. In 1955, oil contributed 44 per cent of Sweden's total energy requirements, while it contributed only 9 per cent in Germany. This explains why Sweden was the country to be hit most severely by the Suez Crisis, and Germany was practically unaffected.

B. Europe's Growing Dependence on Fuel Oils

A breakdown of Europe's consumption figures reveals the growing importance of certain petroleum products. An important development has been the growing use of fuel oil for industrial purposes, particularly in certain branches of the iron and steel industry, while increasing quantities are used for the production of electricity and gas.

Since 1948, the share of fuel oils in Western Europe's petroleum demand has climbed sharply from over a quarter to one third in 1955. In 1955, industry accounted for over 90% of total demand for fuel oil (excl. ocean bunkers). Fuel

oils have recorded the sharpest increase in the demand for petroleum products, and are expected to expand furthermore in the future. By 1960, fuel oil's share in total petroleum products consumption will rise from 35 per cent in 1955 to 42 per cent. This is why, Europe's economy was severely hit by the Suez Canal crisis, because of the heavy reliance of industry on fuel oil.

TABLE -27-

O.E.E.C. COUNTRIES INLAND CONSUMPTION OF PETROLEUM PRODUCTS

(000 Metric Tons)

Products	1948	%	1955	%	1960	%	Index:1955 (1948 100)
Gasoline	10,183	29	20,408	24	32,000	23	201
Kerosene	2,677	8	3,601	4)	35,000	26	134
Diesel Oil	8,519	24	20,297	23)			241
Fuel Oil	9,913	28	30,701	35	58,000	42	310
Others	4,388	11	11,625	14	12,000	9	265
TOTAL	35,680	100	86,632	100	137,000	100	242

SOURCE: P.P.S., October 1956.

II. Western Europe's Supplies of Oil

While consumption has almost quadrupled in Western Europe, during the past ten years, and future estimates show that the future rate of increase is not likely to slow down in the coming decades, "Western Europe is almost devoid of

---

1. Ibid., p. 5.

indigenous oil supplies."[1] In 1955, Europe only produced about 9 million tons of oil while it consumed about 100 million tons in that year. In 1956 its output rose to a little over 10 million tons. This figure includes, however, production from Algeria, Morocco and Yugoslavia. Moreover, its leading producer, Austria, hardly yields any surplus above its own consumption. Total production of crude oil, in Western Europe will not rise more than 10% by 1960. Western Europe has to import its requirements from foreign sources. What are these foreign sources which supply Western Europe with its lifeblood?

The Middle East, as Europe's main supplier is only a post-war phenomenon. In the pre-war period, Europe relied on the Western Hemisphere as its principal oil supplier. In 1938, oil supplies from the Western Hemisphere accounted for over 68 per cent of Europe's total petroleum imports, while about a quarter of Europe's imports came from the Middle East. About 43 per cent of Europe's oil imports in that year came from Venezuela, 25 per cent from the U.S., 25% from the Middle East and 7 per cent from Rumania and the U.S.S.R.[2] Since the war, the pattern of Western Europe's oil imports has undergone a complete change. Europe turned to the Middle East as its main supplier of its oil demand. By 1950, the Middle East was

---

1. Ibid., p. 5.

2. P.P.S., "Changing Pattern of European Imports", Vol. XVII, No. 5, p.127, May 1950.

providing two-thirds of Europe's demand and meeting all the increase in consumption. From a total of 7.1 million metric tons, imports from the Middle East into Europe shot up to 29.8 million metric tons, or four times as large.(1) (From a total of imports of 17.5 million metric tons in 1947 to 37.5 million tons in 1950). In 1951, the Middle East accounted for four-fifths of crude oil imports of the O.E.E.C. area, and the Western Hemisphere accounted for one-fifth.(2) By 1954, Western Europe had absorbed about 90 million tons of Middle East crude which were about 90 per cent of its total crude imports.(3) Except for some speciality of products, oil imports from the Western Hemisphere, especially of imports of crude oil, have virtually disappeared. At the present, about 80 per cent of Western Europe oil supplies come from the Middle East.

While consumption in Western Europe rose from 37 million tons in 1947, to 100 million tons in 1955, there has been also a growth in their refinery throughput from 20 million tons to 103 million tons. Consequently, gross imports increased from 37 million tons to 128 million tons over the same period, while the proportion imported from the Middle East rose from 32 per cent to 80 per cent.(4)

---

1. Ibid.,
2. P.P.S., "Europe's Rising Imports", Vol. XVIII, no. 10, p.335, October 1951.
3. P.P.S., "The Middle East's Rise", Vol. XXII, No. 10, p.366, October 1955.
4. W. King, op.cit., p. 15.

In view of Europe's forthcoming increase in consumption, the Middle East is bound to play an ever more important rôle in satisfying Europe's thirst for oil.

Britain is the largest single oil consumer in Western Europe, and about 80 per cent of its current needs used to come from the Middle East. In 1948, the share of oil supplies to the U.K. from the Middle East was 32 per cent, and rose to 43 per cent in 1949.(1) The Caribbean area, which as recently as 1948 delivered more oil to the U.K. than the whole Middle East, in 1949, it accounted for about 31 per cent of the U.K.'s oil imports.(2) Over the span of six years England came to rely on the Middle East for over 80 per cent of its oil imports.

France, Europe's second largest oil consumer, relies more heavily on oil imports from the Middle East. About 90 per cent of French oil needs are supplied by the Middle East.

TABLE -27-

FRANCE'S IMPORTS OF OIL, 1955
(Tons)

MIDDLE EAST	
Iraq	10,265,626
Kuwait	7,035,232
Saudi Arabia	2,704,199
Qatar	1,336,550
Iran	981,900
N. Zone	221,133
WESTERN HEMISPHERE	1,212,000
Others	268,000
TOTAL	24,024,727

Source: Private

1. A. Murphy, op.cit., p. 19.
2. W. King, op.cit., p. 5.

"It was this mutuality of dependence that persuaded the French and British that their national survival required Nasser's forcible ejection from the Suez Canal".(1)

The reliance of Western Europe on the Middle East has been prompted partly by the desire to economize dollars, and partly by the growth of oil refineries in Western Europe, "but the most important long-term cause of the emergence of the Middle East as Europe's supplier is its possession of almost limitless reserves workable with extraordinary technical economy".(2) Subsequently, each of these factors, will be more fully discussed and analyzed.

A. The Currency Problem in Western Europe's Oil Supplies

The large expansion in Europe's oil consumption with consequently rising imports of oil, has created acute balance of payments problems for Western Europe. Coupled with its adverse balance of payments position vis-à-vis the United States, after the war, Europe had to incur large volumes of oil imports and mostly imports which contained a high dollar content, at a time when Western Europe was implementing every effort to improve its balance of payments position, and reduce its dollar expenditures to a minimum. Western Europe tried to solve its oil payments problems in three ways: by limiting oil imports from the dollar areas and encouraging imports from what came to be termed as "sterling oil", by expanding its refinery capacity, and finally by United States' aid.

---

1. A. Murphy, op.cit., p. 19.

2. W. King, op.cit., p. 5.

1. "Dollar Oil" VS "Sterling Oil"

In 1938, Western Europe imported a total of 31.5 million tons of which 13.7 million tons were payable in dollars. In 1948, almost half of Europe's oil imports were incurred in dollars. By 1951, dollar oil represented one third of total oil imports of Western Europe. Today petroleum imports account for about eight per cent of all West European imports, but this ratio varies from one country to another. In France and Italy this ratio is higher and reaches 12 1/2 per cent. In 1955 dollar oil accounted for one fifth ($2,800 million a year) of the total value of Western Europe's oil imports.(1)

TABLE -29-

EUROPE'S OIL IMPORTS ACCORDING TO CURRENCY EXPENDITURES

(million metric tons)

West Europe	Total Oil	Imports 1948	1950	1955
Imports:				
Payable in $	13.7	20.8	21.7	25.6
Other	17.8	24.3	42.8	102.4
TOTAL	31.5	45.1	64.5	128.

SOURCES: P.P.S., No. 5, May 1951 and P.P.S., No. 5, May 1955

1. P.P.S., "Oil In International Trade", Vol. XXII, No. 5, p. 155, May 1955.

We have seen how Western Europe reduced its imports from the Caribbean area, and almost completely replaced them by those from the Middle East. This has been attained by prompting the production of oil in areas which are either sterling or do not require dollar payments, by strictly limiting dollar oil by discrimination through licensing, and by forcing U.S. companies to go sterling or accept payment in the local currency of the importing country.

It was at this time that the distinction between "sterling oil", "franc oil", and "dollar oil" came to be used. This distinction is based in the case of sterling oil, on oil produced by British companies either in or outside the sterling area. Franc oil has a similar connotation. However, this distinction is rather arbitrary, since most of the oil companies have huge intra-company relations and at the same time, sterling companies had to make dollar expenditures for either buying equipment from the U.S., or to pay operating expenditures of British companies operating in dollar areas.

In the Middle East, Iraq, Kuwait, Qatar and Bahrein are all members of the sterling area. In 1955, these countries accounted together for about three fifths of total production in the Middle East. Therefore, Britain and those who preferred to buy for sterling rather than for dollars, were interested in stemming up their oil imports from these areas. Hence, we witnessed the tremendous shooting up of output in these sterling oil producing areas in the Middle East after the war. This is why the British were

very furious about losing the Iranian oil for it was wholly sterling oil. Similarly, the French were interested in pushing up production of the IPC in which they had a 23 1/3 interest. However, it is very difficult to discern the true dollar content of Middle East oil, since the sterling companies have to incur some dollar expenditures, and the picture is much more complicated than it looks to be.

Sterling oil, however is not enough to meet the demand for oil in the sterling area, and countries in Western Europe that prefer to buy oil for sterling. The deficit must be supplied by dollar oil. These had to be supplied by the U.S. companies, who already had marketing interests in Western Europe. These companies fearing the loss of their markets because of discrimination against dollar oil, were willing to sell oil for sterling in territories where dollars are scarce. However, the U.K. has always disliked this idea, maintaining that it would result in an accumulation of sterling in American hands, which would be merely a deferred claim for dollars; and would tend to weaken the sterling. The U.S. companies were forced to accept the currencies of the various countries in which they traded with whatever degree of dollar convertability attached to them.

England and other Western European countries made agreements with U.S. oil companies which reduced their oil's dollar content. These agreements provided that the U.S. companies would sell in the Sterling Area ad accept

payment in sterling and would have sterling convertible into dollar, equivalent to the current overall dollar content of the sterling companies production. In return, the American companies are granted rights of conversion of their profits. Of these agreements, was an agreement with Socony Vacuum and Standard New Jersey to sell their shares from IPC in sterling, and they would pay IPC in sterling. Another arrangement was made, in 1950, with Caltex to sell for sterling its oil to the U.K. which comes from Bahrein refinery and two-thirds of Caltex's oil from Saudi Arabia. This saved $30-$40 million a year at the time it was negotiated. As a matter of fact, the U.K. was not able to discontinue gasoline rationing until these two arrangements were made in 1950. This policy would not have been taken, had there not been the Middle East oil which did not require dollar payment.

In fact, the U.S. companies, in their efforts to keep their markets, did not only go sterling, but had to go into every currency of each country in Western Europe. The outlook facing the U.S. oil companies was a disturbing one. They saw rising supplies of sterling oil, while at the same time, in many large importing countries dollars were and still are scarce. Hence these companies had to reconsider the currencies in which their sales are made in order to retain their markets. It was no wonder, then, that ARAMCO's 1950 agreement with Saudi Arabia contained an article that payments would be made in currencies in

which sales are made. This was done in order to improve the competitive position of ARAMCO's oil in Western European markets.

Today, while the position of most European countries has improved in respect of the dollar problem, many countries, especially England and France, have still balance of payments difficulties, and their reserves of gold and dollar are still low. Due to the arrangements with the U.S.'s oil companies, only 50-60 per cent of these companies' supplies are payable in dollars.(1)

It is very doubtful that Western Europe could have been able to reduce its dollar oil imports, without the presence of oil supplies from the Middle East, which do not require much dollar expenditures. "The astronomical increase in the demand for oil in Western Europe had to be satisfied from new sources, and preferably sources that did not involve large outlays in dollars. The Middle East was the only such major source."(2)

2. The Growth of Western Europe's Refineries and Middle Eastern Oil

In the post-war decade, there was a tremendous mushroom growth of refineries in Western Europe. This has been prompted by the desire to minimize dollar expenditures, create employment opportunities for its nationals, and providing supplies for the home market.

---

1. P.P.S., "Oil in International Trade," Vol. XXII, No. 5, p. 155, May 1955.

2. W. King, op.cit., p. 15.

The major impetus behind the refinery expansion in Western European has been the desire to save hard currency. As oil imports from the U.S. and the Caribbean area were almost exclusively dollar imports; this involved the expenditure of large sums of dollars on oil imports from those areas. Another factor which had an important bearing on this development arose from the changing position of the United States in relation to the world oil industry. Consumption there had increased so enormously that by 1948 the United States had become a net importer of oil, consuming, not only the major part of its own production but also large quantities imported from the Caribbean area. Therefore Western Europe had to rely on completely its own refining capacity.

The only alternative for Western Europe to provide another source of supply, which did not involve large dollar expenditures was Middle East oil. The establishment of such a huge refining industry in Western Europe, caused a complete shift in its patterns of imports. In 1947, over two-thirds of oil imports consisted of refined products; by 1955 over three-quarters of the total consisted of crude oil. Since the United States and the Caribbean area, insist on the oil companies to refine a major part of the crude produced there locally, exports from these two areas were mainly of petroleum products, and the only source from which Europe could import crude oil was the Middle East, since the governments in this region do not demand from

the producing companies to process part of thecrude locally.

What this meant is that it relieved Europe's balance of payments from a great burden. "Moreover, the relief has been especially marked in the dollar balance, as the increase in supplies of crude has come mainly from the Middle East whilst large additional supplies of products would have been available only from the United States or the Caribbean."(1)

Another factor, which reduced the dollar cost of Western Europe's oil imports is the participation of the American oil companies in this refinery expansion. These companies after the war faced serious competition from British and other non-dollar oil companies, in the oil markets of Western Europe, since most countries there, put many obstacles in the face of dollar oil imports. Obviously the U.S. companies were not willing to lose their markets, and they participated in the oil refining program. However, these companies would not have been able to participate had they not oil resources in the Middle East on which they could draw.

To bring all these factors together, the result was an ambitious refining construction program in all the countries of Western Europe. Whereas refinery capacity then had amounted to 18.4 million tons in 1939, development has been so rapid that by the end of 1954 it had been

---

1. W. King, op.cit., p. 20.

increased to 106 million tons a year and in 1955 to 128 million tons a year, and this progress still continues.

TABLE -28-

GROWTH OF WESTERN EUROPE
REFINERY CAPACITY

(in Million of Tons Yearly)

Country	1938	1950	1951	1952	1953	1954	Index 1938 100
U.K.	3.4	12.5	20.1	24.6	28.5	28.8	847
France	8.1	14.8	20.7	24.5	25.4	27.0	356
Italy	2.3	6.5	9.5	13.5	20.9	23.3	978
W. Germany	3.4	3.5	6.8	8.1	9.8	12.0	353
Netherlands	1.2	3.8	6.4	8.8	11.5	11.6	967
TOTAL	18.4	41.1	76.5	83.0	97.8	105.7	391

SOURCE: Oil Forum, November 1955, p. 391

The U.K. now has the largest refinery capacity in Europe, with plants capable of processing over 29 million tons a year. Next to the U.K. is France with a capacity of nearly 27 million tons per annum, and Italy, with 24 million tons annual capacity is the third largest, followed by West Germany and the Netherlands with annual refining capacities of 12 million tons and 11.6 million tons, respectively.

The parallel development of production in the Middle East, illustrates how closely tied to and dependent was the development of Western Europe's refinery capacity on our oil resources. "The rapid expansion of Europe's refining industry could not have taken place without the

simultaneous discovery of vast new oil resources on the Persian Gulf area."[1]

3. The United States Aid

A major contributor that helped ease Western Europe's dollar problem was the U.S. aid. Under the Marshall plan, Western Europe was authorized procurements of $11,888 million between 1948-1952, of which $1,262 million (10.6%) was for petroleum and petroleum products. The main sources of this oil were: the Middle East ($394.2 million), USA ($306.8 million), Venezuela and Latin America ($156.1 million).[2] In addition to that, the Marshall Plan gave guarantees to U.S. companies for construction of refineries in Western Europe. By the end of the Marshall plan, Europe had received approximately $1,600 million to help her meet her oil imports, thus financing over more than half of Western Europe's dollar expenditures on imports of dollar oil and oil equipment.[3] Importsof crude oil and petroleum of Western Europe from all sources in the four years period totalled about 1,860 million barrels of which 659 million barrels were sold by U.S. companies of which 625 million barrels were sold for dollars.[4]

---

1. S.Yari, "Marketing Middle East Oil", Middle Eastern Affairs, vol. III, Nos. 6-7, June-July 1956, p. 214.
2. P.P.S., May 1952, p. 182.
3. Ibid.
4. Ibid.

This progress in Europe was made possible by the U.S. aid. However, this aid was not only to help Europe overcome its oil's dollar problem, but has also helped its own companies maintain their marketing position in Western Europe. "If it had not been for Marshall Aid, much of the U.S. oil companies' sales of dollar oil in Western Europe would have disappeared at least in terms of dollars."(1)

III The Suez Crisis and Europe's Oil

On July 26th, President Nasser announced the historical nationalization of the Suez Canal Company. Events began to deteriorate quickly after that, and the crisis resulted in the blocking of the Suez Canal and the destruction of the IPC pipeline pumping stations. Consequently there was a drastic reduction of Middle East oil supplies. During the crisis the TAPLINE terminal in Sidon, carrying some 16 million tons a year, was the only outlet kept running. But by order of Saudi Arabia, the U.K. and France were banned any supplies from this outlet. Iraq oil supplies from Northern Iraq of

---

1. P.P.S., "Sterling Ousts Dollar Oil", Vol. XVII, No. 1, p. 21, January 1950.

of 25 million tons a year stopped flowing. Supplies through the Canal of about 77 million tons a year were cut off. In short, Europe lost overnight some 85 per cent of its oil supplies from the Middle East.

Nasser's nationalization of the Suez Canal showed to a frightful extent how Europe's economy has become very dependent on Middle East oil. It revealed to the world's public opinion what rôle the Middle East oil is going to play on the internation scene.

A. The Suez Canal as an Oil Artery

With the increase in demand for Middle Eastern oil in Western Europe, the Suez Canal, came to be an important artery for northbound shipments of oil. In 1955, about 60 per cent of Middle East oil was shipped via the Canal and the rest, 40 per cent, was carried by pipelines to the Mediterranean terminals. Oil tankers accounted for 65 per cent of all traffic in the Suez Canal in 1955.

TABLE - 30 -

TANKER TONNAGE THROUGH THE SUEZ CANAL
(Thousands of Tons)

	Total Traffic	Tankers	Percentage
1913	20,034	489	2.4
1920	17,575	1,049	6.0
1925	26,762	3,422	12.8
1930	31,669	5,218	16.5
1935	32,811	4,860	14.8
1938	34,318	5,970	17.3
1946	32,732	9,919	30.3
1947	36,577	16,069	43.9
1948	55,081	32,279	58.6
1949	68,862	40,195	58.4
1950	81,796	52,092	63.7
1951	80,356	46,732	58.2
1952	86,137	51,822	60.2
1953	92,905	56,374	60.7
1954	102,494	65,012	63.4
1955 (a)	115,756	75,856	65.5

SOURCE: P.P.S., November 1955,
(a) P.P.S., September 1956.

The first tanker that crossed the canal was the "MUREX" in 1892. It had a shipment of kerosene from Batum to Calcutta. The ship had a carrying capacity of 5000 tons. However, such ships with dangerous inflammable cargo were not permitted to use the canal. It was not until 1907

that tankers were permitted to pass through the canal. Before the outbreak of the First World War, tankers accounted for only 2.4 per cent of total traffic through the Canal and they were mostly shipments from the West to India and the Far East. By 1925 tankers' share in canal traffic rose to 12.8 per cent, and were carrying mostly crude from the Persian oil fields. Before the outbreak of the Second World War, their share had risen to 17.3 per cent. Immediately after the war, the percentage jumped to 30 per cent and continued to increase until it reached a ratio of 65.1 per cent of total traffic in the Suez Canal in 1955.

While the volume of oil tonnage increased through the Canal, there has been a change of destination of oil traffic. While before the Second World War, oil traffic in the Canal consisted mainly of products boundfrom refineries West of Suez to the consuming markets East of Suez, the pattern has changed after the war, With the shift of pattern of oil supplies in Western Europe from the Western Hemisphere to the Middle East, and the accompanying rise of production here, South-North traffic of oil in the Suez Canal increased considerably and North-South oil traffic decreased. With the completion of refineries East of Suez North-South bound oil traffic declined from over six million tons in 1954 to about two million tons in 1955, and consisting chiefly of speciality products.

On the other hand South-North bound oil shipments increased rapidly. From a total of 28,930 thousand tons in 1948, West bound oil shipments increased to a total (36,976 thousand tons in 1949), (47,525 thousand tons in 1950), (42,873,000 tons in 1951), (45,933,000 tons in 1953), (49,419,000 tons in 1953), (57 million tons in 1954), (67 million tons in 1955).[1]

The importance of the Suez Canal lies in the fact that 60 per cent of the West's oil supplies pass through the Canal. Out of a total of about 67 million tons of oil of the South-North traffic, 64 millions came from the Persian Gulf, out of which about 51 1/2 million tons were destined to Western Europe, which means that Western Europe is very dependent on the Canal for its oil supplies.

---

1. For the years 1948-1950: P.P.S. March 1951; 1951: P.P.S., March 1953; 1952-1953: P.P.S., March 1954; 1955: P.P.S., September 1956.

More than 60 per cent of oil coming from the Persian Gulf comes from Saudi Arabia and Kuwait. The U.K. and France are the lagest importers of crude via the Suez Canal.

B. The Crisis and the Disruption of Middle East Oil Supplies

During the first half of 1956, oil supplies were moving via the Suez Canal at a rate of 77 million tons per year. Another forty-one million tons were flowing through the pipelines; (25 million tons through IPC; 16 million tons through TAPLINE), thus making a total of 118 million tons a year. Europe receives 105 million tons and the rest are destined to the United States and Canada (5 million through TAPLINE, 8 million tons via the Canal). The crisis occurred and the West was denied about 85 per cent of Europe's supplies.

TABLE - 31-

EUROPE'S OIL SUPPLIES VIA CANAL AND IPC LINES
(million metric tons - based on January-June 1956)

Country	Net Imports	MIDDLE EAST SUPPLIES				
		Total M.E.	Via Canal		Via IPC	
			Tons	Percentage	Tons	Percentage
U.K.	32.6	26.8	23.3	79	3.5	21
France	21.2	23.8	13.8	58.4	10.	41.6
Italy	12.4	15.6	8.6	51.	7.	49.
Netherlands	6.9	9.0	9.0	100.		
Germany	9.4	3.5	1.5	42.3	2.	57.7
Sweden	9.6	2.2	2.2	100.		
Belgium-Luxemb.	5.8	5.3	3.3	62.3	2.	37.7
Denamrk	3.6)	)	)		)	
Norway	3.2)	8.2)	7.2)	87.7	)	
Switzerland	2.4)	)	)		)	12.3
Others	2.2)	)	)		1.)	
TOTAL	109.3	94.4	68.9	63.8	25.5	37.2

SOURCE: Economist, November 10, 1956
and private source.

Some countries were more hardly affected by the crisis than others. Most badly hit was France where 90 per cent of its oil supplies come through the Canal and IPC lines, and next comes the UK, whereby 80 percent of its supplies come through these systems. Italy was also badly hit. What this amounted to is that during the crisis Europe was denied two million barrels daily. The Suez Canal allowed the passage for one million and a half barrels of oil daily to Europe. The IPC pipelines were blown and another half a million barrels daily were lost. Moreover, by order of King Saud, TAPLINE cut off liftings to England of about 125,000 barrels daily, and were denied from Ras Tannura another 300,000 barrels per day. All this loss of oil came dramatically after the aggression on Egypt. The loss was not only in the stoppage of oil supplies, but drastic blows were given to the economies geared to them.

With the buoyant demand on tankers and oil, prices of crude oil and petroleum products were bound to rise. The Suez crisis gave a fresh impetus to the oil companies to increase their prices. Posted prices of crude oil registered an increase of between 23 and 25 cents per barrel for Middle Eastern (1) and and Western Hemisphere's oil respectively. In the Gulf of Mexico, the price per barrel became 3.25 dollars, as compared with

---

1. Ex-Sidon only. Prices on Persian Gulf dropped by about 4 cents a barrel.

a price of $1.97/b for crude oil from the Middle East prior to the crisis.

Since crude prices have risen, it was obvious that product prices should rise too. Product prices rose everywhere in the world, for practically all kinds of products by about one cent a gallon. Most important and the thing which had the worst effect on Europe's economy was the rise in fuel oil prices. During the crisis prices of industrial fuel oil rose by one third or more in the U.K., Western Germany, Benelux, Sweden, Denmark, Switzerland and Spain and by over a quarter in Ireland[2].

What all this amounted to, was to worsen Europe's payments problems especially vis-à-vis the United States. The shift to oil imports from the Western Hemisphere did not only aggrevate the cost of oil imports to Western Europe but also aggrevated them in terms of dollars.

Western Europe has to pay now an extra dollar cost of $1,625,000[2] daily for her oil imports from the Western Hemisphere, plus an extra $1,400,000[3] daily for freight. Together they amount to about three million dollars per day or ninety million dollars per month, or $1080 million per year. This does not include the extra cost of bringing oil supplies from the Middle East via the Cape route,

---

1. P.P.S., "Europe's Dearer Fuel Oil", Vol. XXIV, No. 2, p. 69, February 1957.
2. This is at a price of $3.25 per barrel for a volume of imports of 500,000 b/d.
3. This is at a rate of one sterling pound per barrel.

TABLE -36-

RISE IN SPOT PRICES OF HEAVY FUEL OIL IN W. EUROPE

(For Bulk Delivery to Industrial Users)

Country	Price/Metric Ton (1)		Percent Increase
	£	S	
U.K.	13	14	33
Germany	11	12	40
Belgium	12	5	38
Netherlands	12	7	36
Denmark	13	18	41
Portugal	12	10	11
France	11	9	-
Italy	10	0	-
Austria	7	8	-
Switzerland	17	15	45
Ireland	15	7	27
Norway	11	13	12
Finalnd	22	18	57
Greece	13	8	3
Sweden	12	19	36
Spain	n.a.		35

SOURCE: P.P.S., February 1957.

---

1. Price at 1/1/57.

and which still accounted during the crisis for the bulk of Europe's oil imports.[1]

These huge dollar expenditures represent a heavy burden on the balance of payments and make the exchange problem and the dollar shortage again more acute and more complicated. Britain's and France's position provide us with a vivid example on the situation. The problem arose as to who will pay for this oil. Once more Europe looked towards the United States for help. However, it seemed at this time, that the United States was not willing to start another Marshall Plan. Foreign Aid is being opposed greatly in the United States and both individuals and senators are shouting against the idea: "The enormously larger aid being proposed, however, raises grave problems. How and where and when do we stop? The more than $50 billions of aid we have granted since the end of the Second World War was only a gross waste."[2] With that attitude towards foreign aid in the United States, and with its scarce dollar reserves, Western Europe was not able to withstand for long the disruption of oil supplies from the Middle East.

C. Europe's Measures in Countering the Emergency

The sudden disruption of Middle East oil supplies

---

1. It was estimated by the O.E.E.C. Oil Committee that Europe incurred between $300 and $400 million for oil imports from the Western Hemisphere from the beginning of the crisis till the end of March 1957.

2. Harry Hazlitt, Newsweek, December 24, 1956.

created a serious situation regarding oil consumption in Western Europe. Oil supplies from the Middle East were cut off by about 85 per cent. This happened at a time when Europe's consumption was accelerating at a rapid rate. Against this contingency, Europe had to prepare plans to cope with the oil shortage. On the demand side Europe had to curb its consumption, while on the supply side, it had to rearrange plans for oil supplies and find alternative routes and sources.

After years of rapid rise in oil consumption, Europe had to dwindle down its consumption sharply. More important is that the crisis occurred at a time when oil was being called upon increasingly to meet Europe's rising industrial energy requirements. Moreover, unfortunately for Europe, the disruption of Middle East oil supplies occurred at a time when coal supplies from Poland were cut off, and coal deliveries from the U.S. were delayed because of the shore men's strike then. Hence Europe had to reduce its oil consumption. Coupon rationing with restrictions on other products was introduced except for Austria and Germany, in practically all countries of the O.E.E.C. area.

1. Western Europe's Oil Imports During the Crisis

With the bulk of Middle East oil denied to it, the West had to think and prepare plans about possible alternative sources and routes, that would at least partly offset the cutoff of supplies caused by the closure of the Suez Canal and the IPC pipe-lines. The only alternative for

Europe to get oil was to revert to the Western Hemisphere; and still get some oil from the Persian Gulf round the Cape of Good Hope. According to the MEEC Plan (Middle East Emergency Committee), the output of Venezuela and the United States would be stepped up by an extra 850,000 b/d, of which 800,000 b/d would come from the U.S. and 50,000 b/d would come from Venezuela. Of this some 300,000 b/d would go to the U.S. East Coast to make up for Middle East imports diverted to Europe, and 50,000 b/d would go to Canada for the same reason. This leaves Europe with a total of 500,000 b/d. Europe would also get 750,000 barrels daily round Africa from the Persian Gulf plus 340,00 b/d from the TAPLINE terminal in Sidon.

The MEEC Plan would provide Europe with a total of 1,590,000 barrels daily or about 90 per cent of its normal oil supplies.[1] However, half of this total still comes from the Middle East round the Cape. This was not expected to be coming before a long time, and Western Europe, meanwhile, had to rely on imports from the Western Hemisphere chiefly from the United States. These accounted for only one-third of Europe's imports from the Middle East.

At certain times, the oil lift, under the MEEC Plan, to Western Europe achieved the target that was set for it. Partly because of the availability of tankers at the Gulf of Mexico, and partly because they could be taken from existing stocks, the first shipments

---

1. P.P.S., "Gloomy Prospect for Europe", vol. XXIV, No. 2, p. 63, February 1957.

of American oil reached an average rate of 650,000 b/d during the first three weeks ending December 12th. But owing to many obstacles that faced the increase in production in the United States and Venezuela, these shipments fell down in January to 340,000 barrels per day,[1] and at other times fell almost to zero. However, on the whole, the MEEC plan provided Europe with about 75-90 per cent of its normal requirements of crude oil and other petroleum products during the crisis. The crisis revealed some weaknesses in United States production, such as the inadequacy of transportation facilities, but these could be overcome, and the situation was finally adjusted to meet the emergency demand.

TABLE -32-

CRUDE DISTRIBUTION UNDER MEEC PLAN

(Barrels Daily)

From Middle East	
Round Africa to Latin America	1,392,700
Round Africa to Europe	750,000
TAPLINE	340,000
	2,482,700
From Western Hemisphere	
To U.S. East Coast	300,000
To Canada	50,000
To Europe	500,000
	850,000
Total	3,332,700
World Transportation Deficit	420,000
Total Available	2,912,700

SOURCE: World Petroleum, Vol. 28, No. 12, January 1957.

2. Alternative Routes and Costs

Because of the political risks involved in relying on the Suez Canal, and the vulnerability of the pipelines, the Western powers thought of seeking alternative routes that would lessen their dependence on the Suez Canal and the pipelines that pass through Arab territory. Projects were contemplated for building pipelines passing through friendly territory such as Turkey, or through Africa, or through Israel. The prospects for these projects are not yet known. Whether they will be executed or not depends upon a multiple of political, technical and economic factors. But we can be certain of one thing at least, and that is sometimes political considerations undermine economic considerations.

However, the execution of these projects lies further ahead, and there remain two proposals that need to be studied at the present, and these are, the route of the Cape of Good Hope and the construction of Super-Tankers. In the near future, these two alternatives represent a real threat to the importance of the conventional means of transporting oil via Arab territory.

A. The Cape Route

The extent of traffic and the distances involved are a broad measure of the problem created by the stoppage of oil supplies through the Suez Canal and IPC pipelines. The degree by which the gap could be filled by diverting traffic round Africa is very largely determined by the

TABLE -34-

TANKER DISTANCES AND VOYAGE TIME

Export Terminal	Nautical Miles	Round Trip Days 12 Kt.	18 Kt.
To London from			
Persian Gulf via Suez	6,600		
Persian Gulf via Cape	11,300		
Eastern Med.	3,300		
Venezuela	4,200		
U.S. Gulf	5,000		
To Le Havre			
Haifa	3,260	24 1/2	17
Tripoli	3,305	25	17 1/4
Bahrein	6,280	47	31 1/2
Ras Tannura	6,309	47 1/2	31 3/4
Kuwait	6,495	48 3/4	33
Abadan	6,528	49	33 1/4
To New York			
Haifa	5,219	38 1/4	27 1/2
Tripoli	5,264	28 1/4	27 1/2
Bahrein	8,460	60 1/2	41 1/4
Ras Tannura	8,489	61	41 1/2
Kuwait	8,823	63 1/4	42 3/4
Abadan	8,856	63 1/2	43
Via Cape	12,000		

SOURCES: Oil Forum, Middle East Oil Map, and P.P.S., September 1956.

distances involved and by the availability of tankers to carry the oil. One cannot escape the fact that whereas the distance from the Persian Gulf to the U.S. via Suez is 6,600 nautical miles, the distance by the Cape route is approximately 11,300 miles or about twice as far. On a round trip, the Suez Canal offers a saving of 9400 miles. (See Table 34). Taking the extra costs involved,

this makes the trip around the Cape a rather expensive proposition. On the other hand, if the whole tanker fleet that previously carried oil via the Canal (70 million tons a year), and from IPC terminals (25 million tons), was diverted to carry Middle East oil around the Cape of Good Hope, it will not take more than 50 million tons.(1) The rest would have to be brought from Venezuela. But diversion of tankers to bring additional supplies from the Western Hemisphere would reduce the available tanker tonnage to carry supplies from the Persian Gulf. The degree of success depends, therefore, on the degree of integration and coordination between supply plans and tanker programs. However, with the best organization of tankers schedules, "there will remain in certain consuming areas some shortages which cannot be overcome as long as the Suez Canal remains closed and the pipelines are unrepaired".(2)

b. The Case For Super-Tankers

The prospects for using the Cape route as an alternative for transporting Middle East Oil depend entirely on the case for super-tankers. After the Suez Canel's closure, there has been much talk of by-passing it by

---

1. Economist, November 10, 1956, p. 525.

2. World Petroleum, January 1957.

TABLE -33-

TANKER EMPLOYMENT (% OF WORLD FLEET)*

To	FROM PERSIAN GULF		E. MED.	U.S. GULF	CARIBBEAN
Europe	23		7	1	7
North America	5		2	14	9
Cen. & S. America	2			1	5
Africa	14	14			1
Far East	11	11		1	2
TOTAL	40		13	17	24

* 6% employed on minor routes

SOURCE: Economist, p.525, November 10, 1956.

---

building super-tankers that can carry large supplies of oil round the Cape of Good Hope, at coats competitive those of using the Canal route.

Super tankers could be built only if economies of scale allowed that. In general terms, the bigger the tanker, the less will be the building and operating costs. Building a 60,000 ton tanker does not require as twice as much labor, steel, and other materials as is required in building two 30,000 ton tankers. Operating costs and fixed costs are reduced and spread over a bigger tonnage

and thus reducing the average shipping cost per barrel or ton of oil.

It was argued that the canal has some physical limitations which have to be taken into consideration, and that in the case of super-tankers, the differential in cost between using the Canal and the Cape route is narrowed down. At the present condition of the Canal, the maximum tonnage that could be accommodated safely, is tankers in the 45,000 ton category. These can carry oil to Europe at a freight rate of 70 cents a barrel, as compared to a cost of one dollar for the voyage around the Cape.(1) The usage of the Canal, therefore, saves 30 cents a barrel. In order to be able to use the Canal, super-tankers of 50,000-65,000 tons category have to forego 15 to 20 per cent of their load. This drops the comparative advantage of the Canal to 5 cents per barrel. With tankers of 80,000 ton category and above, the Cape route becomes more favored, especially on the haul to the Americas. However, such an estimate is based on normal freight rates. Moreover, there are two things to be taken into consideration. Firstly, that the Canal could be improved to accomodate for the passage of super-tankers, and secondly, that these tankers are not available at the present time.

Immediately after the Suez Crisis occurred; freight

---

1. A. Murphy, op.cit., p. 82.

rates rose very sharply and this rise makes the cost of the additional length of voyage from the Persian Gulf to Europe via the Cape at least 60 per cent higher.(1) Tanker rates have more than doubled between July, and the end of December 1956. At rates quoted immediately before the crisis it would have cost £ 7 S 10 a ton to bring Middle East oil round the Cape to Europe as compared with a cost of £ 4 S 15 (about 70 cents/barrel) for the trip via Suez. But after the closure of the Canal spot freight rates jumped to about £ 18 per ton ($7.20/b) for shipping oil from the Persian Gulf via the Cape route. At such a rate it would cost about $1 1/2 million for the round trip for a single cargo of 30,000 tons.(2) In light of these dramatic rates, for the trip round the Cape, it was obvious to turn to the Western Hemisphere. But here rates rose also, but not as markedly. The cost of shipment from Venezuela to the U.K. was £ 7 per ton, ($9.50/b)* which is still much higher compared to rates that existed before the crisis, but comparatively cheaper than the Cape route. Unfortunately, Europe as we saw cannot get all its supplies from the Western Hemisphere and had to pay the price for the trip round the Cape route.

In addition to the comparative cost disadvantages

---

1. P.P.S., "Grappling with the Emergency", Vol. XXIII, No. 12, p. 435, December 1956.

2. Ibid.

* At certain times during the crisis, freight rates from Venezuela to the U.K. were as high as $19. per barrel.

of using the Cape route, there are some physical limitations to the expansion of super tankers. Economies of scale abtainable from the larger size of super-tankers are applicable up to a certain size, after which diminishing returns will set in. These advantages are then offset by a rise again in building and operating costs, "because tankers become less flexible in operation as they grow larger,"(1) or require more additional investment. Another obstacle is the shortage of steel plates "which has hampering the rapid expansion of tanker fleets ....and large-diameter pipelines."(2) Moreover, the world's shipyards have orders that will keep them busy for years and thus making it "impossible to get delivery of a tanker ordered now from any European yard before 1961-62; even from Japan and the U.S. one cannot get delivery before 1960."(3) The capital requirements to build the contemplated super-tankers is of the magnitude of £ 1,750-£ 2,000 million. These are very large capital commitments and present many financial problems.

---

1. Economist, p. 397, February 2, 1957.

2. P.P.S., "Tanker Expansion Since Suez", Vol. XXIV, No. 2, P. 65, February 1957.

3. Economist, op. cit., p. 397.

Taking into consideration the extra costs involved in building super-tankers, the limitations imposed on constructing them, the inconveniences of the Cape route, and the large investments required to provide port facilities for them, "it seems doubtful that any larger tankers than (42,000 tons) could operate as cheaply whether it went through the Canal both ways partly loaded or round the Cape fully loaded and back through the Canal in Ballast."(1)

Economies still favor the use of the Canal. "If the Canal were certain to stay open and certain to be able to handle any volume of shipping likely to want to use it, then it seems clear that tankers of 38,000 to 43,000 tons CW would be the most economic on the Persian Gulf-Western Europe haul."(2) But this rests on one consideration, and that is the assurance that the Canal will remain open to navigation. On the other hand, super-tankers of the category of 80,000 tons plus, "the economics solidly favor the Cape route for oil to Europe and, of course, to the U.S."(3) This fact, coupled with the desire to ensure the themselves against contigencies, the oil companies have gone ahead in preparing plans for the construction of large number of super-tankers. The solution to this threat

---

1. Ibid.
2. Ibid.
3. A. Mruphy, op.cit., p. 84.

could be handled only in two ways; to make sure that the Canal will remain open to navigation, and to embark on an expansion program that would enable the Canal to cope with the increased oil traffic in the coming decade.

Middle East oil is vital to the progress of Western Europe. In the coming two decades, Middle East oil will gain more prominence in the non-communist world oil supply situation, as the oil reserves of the Western Hemisphere are depleted. The Suez crisis has shown how vital to the welfare of many nations Middle East oil has become. Those who control the oil resources of the Middle East will decide the fate of those who depend on it. Who owns and who controls oil production in the Middle East, will be the theme of the following chapter.

TABLE 26

MIDDLE EAST OIL EXPORTS 1955

(Barrels daily)

COUNTRY	BARRELS
Britain	470,000
France	452,000
Italy	323,000
Benelux	272,000
West Germany	130,000
Other W. Europe and North Africa	303,000
United States	275,000
Canada	30,000
Latin America	70,000
Japan	130,000
India	91,000
Australia	103,000
Other Far East, Africa	301,000
TOTAL MIDDLE EAST EXPORTS	2,950,000

SOURCE: Private Information.

CHAPTER VI

THE INTERNATIONAL ASPECTS OF MIDDLE EASTERN OIL

The interest in Middle Eastern oil is proclaimed to have an international aspect. The demand for Middle Eastern oil is not only worldwide, but the pattern of ownership is currently ascribed as international. There are interests that represent many nations that operate the oil industry in the Middle East. American, British, Dutch, French, and recently German interests are involved in extracting, transporting, refining and marketing Middle Eastern oil. Accordingly, a certain pattern of ownership of the oil industry in the Middle East has developed. This pattern has persisted throughout the history of the oil industry in the Middle East. Under certain circumstances some of these oil interests acquired a somewhat completely unquestionable monopoly over most of the oil resources of the Middle East. The result of all the diplomatic warfare about the Middle Eastern oil was the emergence of a certain pattern of ownership in which these oil interests have come to control all the oil industry in the Middle East. This pattern of control has been described in political terminology as the international aspect of Middle Eastern oil.

I. The Holding Companies of Middle Eastern Oil*

When the Western powers were encouraging some of their leading oil companies in the twenties to acquire oil rights in the Middle East, they were supporting, whether consciously or unconsciously, the emergence of the biggest monopoly in the world, the international petroleum cartel. Oil diplomacy in the Middle East in the twenties, have brought the leading oil companies in the world together, and made them reach an entente about stopping cut-throat competition between them, and instead agree for the benefit of all of them. As a result, several agreements were made, between these oil companies in which they pledged cooperation about every aspect of the business in all parts of the world. This Entente Cordiale Group, which was composed of the oil companies controlling the Iraq Petroleum Company, has grown into an international petroleum cartel which controls most of the world's oil resources. This cartel does not only control production of oil, but controls all the phases of the oil industry from production to marketing. The seven companies that comprise this cartel, control production, transportation facilities, whether by tanker or pipeline, refining, and marketing. Outside the United States, this cartel has

---

* See Appendix to this chapter.

TABLE 37

STAKES IN THE MIDDLE EAST

(1955 output in millions of metric tons)

Middle East:	BP	Gulf	RD-Shell	SO (NJ)	SO Calif.	Texas	Socony Mobil
Kuwait	27.4	27.4	-	-	-	-	-
Saudi Arabia	-	-	-	14.2	14.2	14.2	4.8
Iraq	2.9	-	7.9	4.0	-	-	4.0
Iran	6.4	1.1	2.2	1.1	1.1	1.1	1.1
Qatar	1.3	-	1.3	0.7	-	-	0.7
Rest of ME	0.4	0.2	0.4	-	0.8	0.8	0.3
Total Middle East	43.4	28.7	11.8	20.0	16.1	16.1	10.9
Total World *	43.4	48.4	78.9	111.6	37.6	45.4	31.9

Source: The Bankee, opcit. p.6.

* On basis of seven barrels to one ton; taking conversion factor adjusted for each producing country, total 1955 output of seven companies was about 382 million tons, comprising 52 3/4 per cent of total output of free world.

control over 90 per cent of the oil industry in the non-communist world.

In the Middle East, until recently, this petroleum cartel has been controlling practically all production of crude oil. Seven oil companies control the oil resources of the Middle East, and most of the oil resources in the Free World. Prompted by the benefits achieved from co-operation in the Middle East, these companies have applied that in all their operations the world over. These seven oil companies are: Standard Oil Co., (New Jersey), Stanford Oil Company (California), Socony Vacuum Oil Co., Inc., Texas Oil Co., Gulf Oil Corporation, Royal Dutch-Shell Group, and British Petroleum. Two of them are British and Dutch, and the other five are American companies. Through joint ownership, these companies have come to monopolize Middle Eastern oil production and consequently through monopolistic agreements such as the Red Line agreement, worked to prevent outside competitors.

The seven oil companies that control output in the Middle East received from Middle East resources a total of 147 million metric tons in 1955. The total output of the seven companies was about 382 million tons, comprising 52 3/4 per cent of total output of the free world. Except for Standard (N.J.) and Royal Dutch-Shell group, all the other companies received half of their crude output from their Middle East resources. On the other hand, the one hundred and forty-seven million tons which these companies

received from the Middle East represented about 39 per cent of their world-wide crude production.

II. International Interests in Middle East Oil

Owing to the immense importance that oil had gained, there followed, after World War One, a race between governments, especially those of the United States, England, and France, to control the oil resources of the Middle East or what was then called the remnants of the Old Ottoman Empire. Each government desired to secure for itself as much as possible, and all three wished to prevent any outsider from entering the field.

At the start, in 1914, influence in Middle East oil was completely European, with British interests as the sole dominator, controlling then, nearly the whole output in the Middle East through their control of the output of Persia, the only producer then in the area (except for a minor output in Egypt). At the same time there were active negotiations between some European powers for oil concessions in Iraq, which resulted in the formation of the Turkish Petroleum Company. In 1914, the British held about 60 per cent interest in T.P.C., and Germans held about 25 per cent interest, and the Dutch interests were about less than 15 per cent in the company.

At the outbreak of the First World War, the activities of T.P.C. were suspended. The German interest was

vested in the Custodian of Enemy Property and later transferred to the Compagnie Francaise des Petroles.[1] German interests reentered the Middle East in the early thirties, when together with Italian interests, they secured a predominant share of the British Oil Development Company, which in 1932 was granted a concession in the Mosul area of Iraq. However, under certain circumstances, which are beyond the scope of this thesis, the Iraq Petroleum (as the Turkish Company had been re-named in 1929) bought the concession and the assets of the British Oil Development Company. By 1941 the German and Italian interests had been absorbed and the Company was reestablished as the Mosul Petroleum Company, a wholly owned subsidiary of I.P.C.

It was not until the twenties that American interests edged into the oil panorama in the Middle East. The first foothold the Americans had in Middle East oil, was their participation in Iraq Petroleum. This was secured in 1928 after six years of fighting and struggle in which the State Department played an important role in supporting American companies to gain a stand in the Middle East oil, in front of the monopolistic policy of the British

---

1. For a detailed analysis, see International Petroleum Cartel, which is the best on the subject.

Government. In 1928, the company was reconstituted on the following bases:

British Petroleum Co. Ltd.	23.75%
Royal Dutch Shell Group	23.75%
Compagnie Francaise des Petroles	23.75%
Near East Development Corp. (Standard Oil Co. (N.J.) 50%) (Socony Mobil Oil Co. 50%)	
Participations and Explorations Corp. (C.S. Gulbenkian Estate)	5.00%

The U.S. companies agreed to conform to the principle laid down in 1914 at the Foreign Office conference that the companies participating in the Iraq consortium will develop jointly all oil resources in the Middle East except those in Iran, Egypt and Kuwait.(1)

Soon afterwards, American companies outside Iraq Petroleum began to push south, to the areas on the Persian Gulf. In 1927, Gulf Oil Corporation bought from a British firm an oil concession for Bahrein. Later on, Gulf sold its half interest to Standard Oil of California.

In 1932 oil was discovered in Bahrein, stimulating the extension of exploration into Kuwait, the Qatar Peninsula, and Saudi Arabia. The IPC and the newly formed

---

1. U.S. Senate, Federal Trade Commission, International Petroleum Cartel, (hereinafter I.P.C.), Staff Report to the Subcommittee on Monopoly of the Select Committee on Small Business, Washington 1952, p. 56.

Bahrein Petroleum Company entered into negotiations with Saudi Arabia; the outcome was a grant in 1933 to Standard Oil of California, which immediately set up the California Arabian Standard Oil company to operate the concession. In 1935 Anglo-Persian (later Anglo-Iranian, and recently British Petroleum), obtained a concession in Qatar, and in accordance with its obligations to IPC transferred it to an IPC affiliate.

Meanwhile, the British Government, on the basis of its treaty powers with the Sheikh of Kuwait, used its influence to secure the entry of Anglo-Persian as a joint partner with Gulf Oil in 1934. At about this time (in 1936) the Texas Oil Company acquired a half share in Standard Oil's interest in both Bahrein and Saudi Arabia, in return for a transfer to Bahrein Petroleum of its valuable marketing network in South Africa, the Far East and Australia. The U.S. companies that obtained concessions in Bahrein, Kuwait, and Saudi Arabia were not members of IPC and had no obligation to share their interests.

By 1939, therefore, the foundation of America's majority interest in the Middle East oil had been laid.

Only two major changes in this pattern of international interests in the Middle East have taken place since the war. The first has been the broadening of American participation in Saudi Arabia into ARAMCO which has brought in Standard Oil (New Jersey) (30%) and Socony

SHARE OF OIL PRODUCTION OF MIDDLE EAST COUNTRIES

(In thousands of barrels daily)

YEAR	British-Dutch		American		Others		Area percent of total foreign production
	Production	Percent of Area	Production	Percent of Area	Production	Percent of Area	
1912							1.3
1913	5.1	100.0	...	...	.....	.....	5.5
1921	45.7	100.0	...	...	.....	.....	10.2
1923	150.6	99.9	0.1	0.1	.....	.....	14.2
1939	247.5	78.3	49.8	15.7	19.0	6.0	9.0
1941	167.1	83.2	33.7	16.8	.....	.....	14.4
1943	278.4	87.7	39.0	12.3	.....	.....	16.5
1944	353.4	87.2	51.8	12.8	.....	.....	25.2
1946	461.5	65.9	214.3	30.6	24.3	3.5	26.2
1947	504.8	60.2	313.7	37.5	19.4	2.3	29.8
1948	627.5	55.1	497.1	43.7	13.4	1.2	32.8
1949	741.9	52.9	645.2	46.0	15.8	1.1	35.1
1950	939.1	53.5	782.7	44.5	34.5	2.0	34.3
1951	697.2	36.2	1,121.7	58.2	109.1	5.6	34.4
1952	606.0	29.1	1,328.7	63.8	149.2	7.1	36.6
1953	760.2	31.4	1,456.8	60.1	207.3	8.5	n.a.
1954	887.4	32.2	1,637.6	59.5	228.2	8.3	

Sources: Years 1912-1953, Fanning, Foreign Oil and the Free World, p. 354.

1954 - Petroleum Times, October 4, 1955.

Mobil (10%) to join Standard Oil of California and the Texas Company (30% each). The second and more far-reaching changes resulted from the shake-up in Iran - where British petroleum is now limited to a 40 per cent interest in an international consortium, an interest that is exactly matched by the combined holdings of the fourteen American participants. (See Appendix to this chapter)

All this movement was a part of an underlying struggle and rivalry between the United States concerns and British concerns. It was first emphasized in the difficult negotiations that involved the participation of U.S. companies in IPC and was evident in the Consortium's arrangements with Iran. In 1913 British-Dutch concerns had a one hundred per cent control over oil production in the Middle East. By 1939, the British lion's share in the control of Middle East oil dropped to 78.3 per cent and the American interest rose from zero in 1913 to 15.7 per cent in that year. Immediately after the war, the Americans have secured for themselves a 30.6 per cent interest in Middle East oil and consequently the British share fell off to 65.9 per cent. After 1951 the balance of interests in Middle East's oil has undergone a basic change, and American interests have come to control then 58 per cent of the oil resources in the Middle East.(1) In 1954 U.S. interests controlled

---

1. Fanning, Leonard, Foreign Oil and the Free World, Appendix I. Table 20, p. 354

about 59.5 per cent of Middle East's production and British and Dutch interests accounted for about 32.2 per cent of the balance of total production in that year.(2) In 1955, the British Dutch concerns had a 35.4 per cent interest in Middle East oil and the U.S. concerns had about 58.4 per cent. (See Tables 38 and 39).

In concluding, one has to recall that Middle East oil has a multi-national aspect on the basis of the pattern of ownership. However, ownership of Middle Eastern oil is confined mainly to four Western powers, with British and American interests constituting the major share of ownership and French and Dutch interests being minor partners.

TABLE -39-

CHANGE IN FINANCAIL INTEREST IN MIDDLE EASTERN OIL

(Based on Crude Oil Reserves)

Interests	1946	1955
American	49.9	58.4
British	6.8	7.0
French	6.8	5.3
Other	1.2	0.9
TOTAL	100.0	100.0

SOURCE: Middle East Oil Development, Aramco, March 1956.

Unfortunately, these oil interests are all foreign. Except in Egypt, where the Egyptian government had a nine per cent interest in the Anglo-Egyptian Oilfields Company, national participation in oil production in the Middle East is almost absent. The reasons for the domination of foreign interests over oil production in the Middle East can be explained in the light of the oil situation in the home countries of these oil interests. Except for American interests, the other foreign interests possess very little or no oil resources at all in their countries. Even the United States companies were motivated to participate in the development of the oil industry because of the fear from an oil shortage in the early twenties. Now that these interests have come to control the oil resources of the Middle East, and that it has been established that they need this oil, what other factors make them concentrate on the development of Middle East oil instead of developing oil resources in other parts of the world, especially in the United States? Does Middle East oil enjoy certain economic aspects that attract these oil interests to develop it? This is what we shall find out in the succeeding chapter.

MIDDLE EAST OIL CONCESSIONS

1. IRANIAN OIL PARTICIPANTS (UNDER AGREEMENT WITH GOVERNMENT OF IRAN AND NATIONAL IRANIAN OIL CO.)

AGREEMENT: 25 years from 1954, expires 1979; plus 15 years optional.

AREA: Approximately 100,000 square miles.

OWNERSHIP:

British Petroleum Co. Ltd		40%
Royal Dutch/Shell group		14%
Compagnie Française des Petroles		6%
Standard Oil Co. (N.J.)		7%
Standard Oil Co. of California		7%
The Texas Co		7%
Gulf Oil Corp		7%
Socony Mobil Oil Co		7%
Iricon Agency, Ltd		5%
	Richfield Oil Corp	1.250%
	American Independent Oil Co	0.833%
	Standard Oil Co. (Ohio)	0.417%
	Pacific Western Oil Corp	0.417%
	Signal Oil and Gas Co	0.417%
	The Atlantic Refining Co	0.417%
	Hancock Oil Co	0.417%
	Tide Water Associated Oil Co	0.417%
	San Jacinto Petroleum Corp	0.417%

2. KHANAQIN OIL CO., LTD.

CONCESSION: 60 years from May 28, 1901; extended 35 years on May 24, 1926; expires 1996.

OWNERSHIP:

British Petroleum Co., Ltd	100%

3. IRAQ PETROLEUM CO., LTD.

CONCESSION: 75 years from March 14, 1925; expires 2000.

AREA: Provinces of Baghdad and Mosul east of the Tigris River (approximately 32,000 square miles) except for Khanaqin concession.

OWNERSHIP:

British Petroleum Co., Ltd	23.75%
Royal Dutch/Shell group	23.75%
Compagnie Française des Petroles	23.75%
Near East Development Corp	23.75%
(Standard Oil Co. (N.J.) - 50%)	
(Socony Mobil Oil Co. - 50%)	
Participations and Explorations Corp. (C.S. Gulbenkian Estate)	5.00%

4. MOSUL PETROLEUM CO., LTD.

CONCESSION: 75 years from May 25, 1932; expires 2007.

AREA: All of Iraq west of Tigris River and north of Latitude 33°N.

OWNERSHIP:

Same as Iraq Petroleum Co., Ltd.

5. BASRAH PETROLEUM CO., LTD.

CONCESSION: 75 years from November 30, 1938; expires 2013.

AREA: All of Iraq, including islands, territorial waters and submerged lands not covered by I.P.C., Mosul and Khanaqin concessions. Plus Iraq's undivided half-interest in the Iraqi-Saudi Arab Neutral Zone.

OWNERSHIP:

Same as Iraq Petroleum Co., Ltd.

../2..

6. SYRIAN-AMERICAN OIL AND GAS CO.

EXPLORATION PERMIT: 4 years from May 19, 1955; renewable for 4 years.

AREA: Approximately 6,000 square miles in northern Syria.

OWNERSHIP:

James W. Menhall and associates..... 100%

7. D'ARCY KUWAIT CO., LTD. AND GULF KUWAIT CO.
(KUWAIT OIL CO., LTD.- OPERATOR)

CONCESSION: 75 years from December 23, 1934; extended on December 1, 1951; expires 2026.

AREA: All of Kuwait, including territorial waters to a 6-mile limit.

OWNERSHIP:

D'Arcy Kuwait Co., Ltd..... 50%
(British Petroleum Co., Ltd.)

Gulf Kuwait Co..... 50%
(Gulf Oil Corp.)

8. PACIFIC WESTERN OIL CORP.

CONCESSION: 60 years from February 20, 1949; expires 2009.

AREA: All of the King of Saudi Arabia's undivided half-interest in Saudi Arab-Kuwait Neutral Zone including islands and territorial waters.

OWNERSHIP:.....

J. Paul Getty interests 100%

9. AMERICAN INDEPENDENT OIL CO.

CONCESSION: 60 years from June 28, 1948; expires 2008

AREA: All of the Shaikh of Kuwait's undivided half-interest in Saudi Arab-Kuwait Neutral Zone, including islands and territorial waters.

OWNERSHIP:

Phillips Petroleum Co.....	33.54%
Hancock Oil Co.....	15.08%
Signal Oil and Gas Co.....	15.08%
Ashland Oil and Refining Co.....	12.70%
Ralph K. Davies	8.25%
J.S. Abercrombie	6.35%
Crescent Corp.....	3.17%
Sunray Mid-Continent Oil Co.....	2.65%
Globe Oil and Refining Co.....	1.59%
Lario Oil and Gas Co.....	1.59%

10. ARABIAN AMERICAN OIL CO.

CONCESSION: Original area, 66 years from July 14, 1933, expires 1999; additional area, 66 years from July 21, 1939.

AREA: In excess of 365,000 square miles, after relinquishments through 1955. Concession includes islands, territorial waters and offshore area.

OWNERSHIP:

Standard Oil Co. of California	30%
The Texas Co.....	30%
Standard Oil Co. (N.J.)	30%
Socony Mobil Oil Co.....	10%

11. BAHRAIN PETROLEUM CO. LTD.

CONCESSION: Expires 2024.

AREA: All of Bahrain, including islands, waters and submerged lands over which the Shaikh has or may acquire dominion

OWNERSHIP:

Standard Oil Co. of California 50%
The Texas Co. 50%

12. QATAR PETROLEUM CO., LTD.

CONCESSION: 75 years from May 17, 1935; expires 2010.

AREA: All of Qatar over which the Shaikh rules, including territorial waters to a 3-mile limit.

OWNERSHIP:

Same as Iraq Petroleum Co. Ltd.

13. 'SHELL' OVERSEAS EXPLORATION CO., LTD. (SHELL CO. OF QATAR - OPERATOR)

CONCESSION: Expires 2027.

AREA: Continental shelf offshore from Qatar beyond a 3-mile limit

OWNERSHIP:

Royal Dutch/Shell group 100%

14. ABU DHABI MARINE AREAS, LTD.

CONCESSION: 65 years from March, 1953; expires 2018.

AREA: Offshore areas of Abu Dhabi

OWNERSHIP:

British Petroleum Co. Ltd..... 66 2/3%
Compagnie Francaise des Petroles 33 1/3%

15. DUBAI MARINE AREAS, LTD.

CONCESSION: 60 years from August 1952; expires 2012.

AREA: Offshore areas of Dubai

OWNERSHIP:

British Petroleum Co. Ltd..... 66 2/3%
Compagnie Francaise des Petroles 33 1/3%

16. PETROLEUM DEVELOPMENT (TRUCIAL COAST) Ltd.

CONCESSION: Various concessions for 75 years from 1937 and subsequent years

AREA: Land areas of a group of small shaikhdoms

OWNERSHIP:

Same as Iraq Petroleum Co. Ltd.

17. PETROLEUM DEVELOPMENT (OMAN), LTD.

CONCESSION: 75 years from 1937; expires 2012.

AREA: Sultanate of Muscat except the district of Dhofar.

OWNERSHIP:

Same as Iraq Petroleum Co. Ltd.

18. DHOFAR CITIES SERVICE PETROLEUM CORP.

CONCESSION: 25 years from date of commercial production, with option to renew for an additional 25 years. Granted January 17, 1953.

AREA: District of Dhofar

OWNERSHIP:

Cities Service Co..... 100%

19. PETROLEUM CONCESSIONS LTD.

EXPLORATION PERMIT:

AREA: Aden, including Hadhramaut.

OWNERSHIP:

Same as Iraq Petroleum Co. Ltd.

20. YEMEN DEVELOPMENT CORP.

CONCESSION: 30 years from 1955; expires 1985.

AREA: Northeastern two-thirds of Yemen; approximately 40,000 square miles.

OWNERSHIP:

George E. Allen and other American interests..... 100%

21. C. DEILMANN BERGBAU

CONCESSION: 5-year exploration permit granted in 1953. If oil is found in commercial quantities, permit becomes valid for 20 years. Expires in 1958 if no oil is discovered.

AREA: Coastal and southern areas of Yemen

OWNERSHIP: 25%

C. Deilmann Bergbau, West Germany 25%
Yemen 75%

22. D'ARCY EXPLORATION CO. LTD.

EXPLORATION PERMIT:

AREA: Kamaran and other British-controlled islands off the coast of Yemen, including their territorial waters. Islands are administered by government of Aden.

OWNERSHIP:

British Petroleum Co., Ltd..... 100%

SOURCE: Oil Development in the Middle East, Arabian American Oil Company, March, 1956.

CHAPTER VII

ECONOMIC ASPECTS OF MIDDLE EAST OIL OPERATIONS

The purpose of this chapter is to inspect the various economic aspects of Middle East oil operations in order to appreciate the economic importance of Middle East Oil. It aims at making a comparative economic analysis of the place of Middle East oil industry vis à vis the world oil industry. Accordingly, is it true that Middle East oil is cheap as currently asceribed and in what sense is it cheap? This could be best achieved by observing what happens to this oil from the time it is produced to the time it reaches the final consumer at the gas station or in whatever other form. However, it is the duty of the writer to state here that no information was obtainable about Middle East oil marketing operations whatsoever.

I. Cost of Production of Middle Eastern Oil

Though the subject of crude oil costs is very important, unfortunately there are very few published statistics on this matter, partly because the oil companies are reluctant to disclose such information, and partly owing to the difficulty involved in assessing it. It is important in order to evaluate the comparative economic position of Middle East crude oil over crude

produced in other regions, that costs should be studied and compared.

Oil production costs vary from one region to another depending upon a number of variety of factors which make costs higher in one region or cheaper in another. These are geological, political, geographical, and social factors.

According to the investigations of the United State's Senate, the cost of production in 1946 was forty cents in Saudi Arabia, 25 cents in Bahrein, and 27 cents in Kuwait.(1) These included royalties of ¢21 per barrel, ¢15 per barrel, ¢14 per barrel, for each country respectively. Subtracting these royalties from total cost, one gets a net production cost of 19 cents per barrel in Saudi Arabia, 10 cents in Bahrein and 13 cents in Kuwait. Compared to these figures, production costs in 1946 were $1.85 in the U.S.A., and $85 in Venezuela.(2) Today, the companies maintain that their operating costs have risen, because of the facilities they have to provide for their workers to make them live in the desert, and because of higher royalty payments. Aramco maintains that its straight operating costs are about 40 cents a barrel. One can, however, arrive at costs, at least theoretically in this way. Since oil

---

1. I.P.C., op.cit., p. 367.

2. Mickessel, op.cit., p. 19.

cf. Bibliography

royalties are supposed to be half the annual profits, multiplying royalties by two, and then dividing by the number of barrels produced, one arrives at the net profit per barrel of oil produced. Then **subtracting** this figure from the selling price one gets the net cost per barrel. Adopting this formula production cost in Saudi Arabia were 26 cents in 1955 (1), and similarly in Kuwait (2), and less than 10 cents per barrel in Bahrein. However, costs are still below this level for; after all, the companies tend to overestimate their costs, and secondly, they fix the price, and move it upward or downward as their interests imply. It was estimated that production costs in Kuwait, "cannot be much more than 10 cents a barrel" (3).

On the other hand, a distinctive feature of U.S. oil industry is the rise in production costs. Due to low yield per well and the consequent use of pumps, the increasing depth of wells, the higher prices of land leases, the percentage of dry holes, costs have been rising

---

1. Royalties $280 million x 2 $560 million. Total profit 560 ÷ 47.5 millions $12 profit per ton. 12 ÷ 7 $1.71 profit per barrel 1.97 (selling price/bbl in Ras Tannura) - 1.71 = $.26 cost per/bbl.

2. $\frac{280 \times 2}{47.5} \div 7$ 1.46 $1.72 selling price/b at Mina Ahmadi - 1.46 = .26

3. Life, November 12, 1956, p. 86.

steadily. In 1941 costs were 76 cents per barrel.(4) These jumped to $1.17 per barrel in 1950, and to $1.76 in 1954. This figure is more than the selling price of Kuwait's oil. This great disparity in production costs between Arabian oil and foreign oil is accounted for by at least four factors: geological, social, geographical and political.

TABLE -41-

COSTS OF CRUDE OIL PRODUCTION IN THE UNITED STATES

1946-1954

YEAR	$ PER BARREL	YEAR	$ PER BARREL
1946	.84	1951	1.41
1947	1.00	1952	1.55
1948	1.20	1953	1.58
1949	1.24	1954	1.76
1950	1.17		

SOURCE: E. Pogue and K. Hill, Future Growth and Financial Requirements of the World Petroleum Industry, p. 119.

A. Geological Factors

There are geological factors which enable Middle Eastern oil to be produced at a cheaper cost, and allow

---

1. P.P.S., "U.S. Reserves Sustained", Vol. XXII, No. 41, p. 120, April 1955.

the use of the most efficient method of exploration and production.

Exploration costs are low and much less than elsewhere in the world, because of the lower percentage of dry holes. Nearly 85.8 of all wells drilled in the U.S. are dry holes.(1) Out of a total number of 11,280 exploratory wells drilled in the U.S. in 1954 only 1575 wells found oil. In 1953, out of a total expenditure of $1,956 million on exploration in the U.S., dry holes accounted for $797 million or about two-thirds.(2) While in the Middle East, practically every well that was dug was a producing one. For every dollar that was invested in the Middle East oil reserves were discovered at a rate 17 times more than for every dollar invested in the Caribbean Area.(3) Over 13,000 barrels of oil have been proved per foot drilled in the Middle East, while the comparable figure for Venezuela is between 600 and 700 varrels and that for the United States is only 20-30 barrels.(4)

Secondly, production costs in the Middle East are

---

1. P.P.S., "Survey of U.S. Crude Oil Costs", Vol. XXIII, No. 6, p. 226, June 1956.

2. Loc.cit.

3. Mickessel, op.cit., p. 53.

4. P.P.S., "The Incomparable Middle East," Vol. XXIII, No. 7, p. 240, July 1956.

less than those in the United States and Venezuela, because of the high productivity per well. Production per well in the Middle East was 7244 barrels per day in 1949, with Iraq leading by 11,000 b/d and Saudi Arabia 6083 b/d,[1] while in 1954 production per well in Venezuela was 210 b/d, and in the U.S. no more than 13 b/d.[2] In 1956 there were 537,682 wells producing in the United States with an average daily production of 7,165,600 b/d, and 30,262 wells in the Caribbean and Canada with a daily production of 3,380,000 b/d, while only 1525 wells accounted for a daily production of 3,678,600 barrels in the Middle East.[3] This abudance of productivity per well is very important for two reasons: firstly, it makes possible production from a few number of wells; and secondly, unit costs are spread over a large number of output per barrel.

Thirdly, the depth of wells is much less in the Middle East, than in the United States. Oil is very near to the surface which makes its extraction much easier and less costly. In the United States, one ton of steel is needed to increase production by 250 b/d while in Saudi Arabia this would lead

---

1. In 1955, Saudi Arabia had an average production of 6277 b/d, $\frac{352,239,912 \text{ barrels}}{154 \text{ wells}}$ (total production)
2. P.P.S., September 1955, p. 332.
3. Oil Forum, December 1956.

to increase in production by about ten times this figure.[1]

B. Social Factors

Another factor which reduces production costs considerably in the Middle East is the labor element. In the Middle East, labor is relatively cheap, and could be drawn from the large pools of unemployment, while in the United States labor is relatively dear, and affects costs heavily. On the other hand, labor costs are rising quickly in Venezuela, and there were many troubles between the companies and the national employees. The companies are taking full advantage of this factor, and this explains their complete willingness to employ a large number of Middle-Easterners; and even replace foreign staff by nationals.

C. Privileges

These companies operating in the Middle East enjoy a number of privileges. Such privileges have reduced costs to be incurred by them considerably and made their operations highly profitable. These, they got at a time, when the countries of the Middle East were, or are still, under the political control of some foreign powers. Thus the oil companies were granted exclusive rights and unbequeathed privileges.

One advantage which the oil companies got is the exclusiveness of the concession. Usually the concession

---

1. Mickessel, op.cit., p. 54.

covers the whole area of the country. These vast areas permit the use of the most efficient methods of exploration and production. There is no fear that the area of the concession is too small that does not warrant the use of a certain modern apparatus. Moreover, there is always hope that a dry well in this area will be compensated for by more producing wells in another area, and the expenditure on the purchase of huge machines needed for the project will not go to waste.

Another factor which reduces the production costs of operating companies in the Middle East is the privilege they enjoy from exemption from most of local taxes. These privileges amount in all cases of making the oil company a state within a state. The exemption from these taxes is depriving the Arab countries an income which would increase the revenue which they get from the oil companies. Of all the Arab countries, Lebanon has been aware of this point and has taken a firm stand to assure its rights.

All these factors have made Middle East oil cheaper to produce. Because of its abundance, Middle East oil is still the cheapest in the world. None of the operating companies in the area has ever revealed its precise costs. However, one can discern the relative cheapness of Middle East oil from very few statistics. Only 5 per cent of the free world's total investment in oil operations of

$63 billion, were sufficient to develop crude production in the Middle East to about 20 per cent of the world's total, and locate there 75 per cent of the world's total reserves.(1) Moreover, Middle East oil is reaching the United States and is selling there at a price very competitive with crude prices there after paying for transport costs for the long journey and U.S. import tax. These crude imports from the Middle East have increased today and are still competitive despite the fact that royalties have increased considerably to a total of about 80 cents a barrel.

TABLE - 40-

ESTIMATED LANDED COST IN THE U.S. OF FOREIGN OIL

(U.S. $ PER BARREL)

	ARABIAN OIL		VENEZUELAN	U.S. GULF COAST
	1947	1953	1947	1947
Cost of Production	.30	.26	.50	1.85
Transportation	.75	.86	.20	.35
Royalty	.21	.80	.35	
U.S. Import Taxes	.105	.105	.105	
Diff. in refinery realization	.20		.10	
Profit	.25		.25	
Total Cost	1.82	2.07 1/2	1.51	2.20

SOURCES: Mickessel, Arabian Oil, p. 19
and for 1953, private source.

---

1. Life, November 12, 1951

Today, according to an estimate made by B. Jennings, President of Socony Mobil Oil, Middle East oil priced at $1.97 a barrel at Ras Tannura will, after absorbing freight costs of 86 cents a barrel, and after paying U.S. duty of 10 1/2 cents, give a delivered price of $2.94. "This is some 25 to 40 cents less than the c.i.f. value of an equivalent gravity of domestic oil at New York."(1) We must remember, however, that this estimate is based on the f.o.b. price on the Persian Gulf, while what matters in this respect is the cost of production; for importers in the United States are the same owners of the oil imported by them. When based on costs the price differential rise to about 87 cents per barrel. (Delivered price/b $2.07 1/2 - $2.94).

II Shipping Middle Eastern Oil

Transporting Middle Eastern oil is one of the factors that hindered production in the past. The distances involved and the lack of adequate transport facilities caused the delaying of the development of Middle Eastern oil. Today this problem was solved by the provision of tankers and by building pipelines. Shipping Middle Eastern oil has given ground to serious controversies about the most economical and efficient way of moving Middle Eastern oil. The question that concerns us here is not only how to move the oil, but also who moves this

---

1. B. Jennings, op.cit., p. 4.

oil and what benefits accrue to those who transport Middle Eastern oil.

About 60 per cent of Middle Eastern oil moving westward is shipped by tankers from ports on the Persian Gulf and the remaining forty per cent is carried by pipelines to ports on the Mediterranean, and from there they are loaded on takers to be shipped to the various consuming markets.

About 53 per cent of the world's tanker fleet is employed in carrying Middle Eastern oil to the various consuming markets. Forty per cent of the world's tanker fleet is engaged in moving the oil from the Persian Gulf, and thirteen per cent carry the oil from the pipeline terminals on the Mediterranean (See Table 33).

A. Ownership of Shipping Facilities

The same oil companies that controlled about 99 per cent of Middle East's output, have under their control also all the shipping facilities that move Middle Eastern oil. This international Petroleum Cartel owned or controlled two-thirds of the world's tanker fleet in 1948.(1) In 1948, Anglo-Iranian owned, through its subsidiary, British Tanker Company, 134 ships with a total dead weight of 1,400,000. By 1953, it owned 152 ocean-going tankers, with a dead weight tonnage of 1,900,000, and commitments have been made for the building of a further 28 tankers

---

1. I.P.C., op.cit., p. 27.

totalling 650,000 tons. Its fleet's worth was valued at £ 80 million. On May 18th, 1956, British Petroleum owned fleet's capacity totalled 2,017,700 and committments will bring the fleet's capacity to 3,243,000 dead weight tons.(1) Royal Dutch-Shell had under their control in 1949 more than 4 million dead weight tons. At present, the Royal Dutch-Shell group's fleet has a capacity of 2.8 million tons. Another 4.9 million dead weight tons are under the group's control through long-term charter.(2)

Today, Royal Dutch-Shell group and British Petroleum (Co. Francaise des Petroles) own one fourth of the world's tanker fleet. The five major American companies controlled in 1949 about 5 million dead weight tons or about 20 per cent of the world's tanker fleet.

Excluding the vessels of the 50% owned Standard-Vacuum Oil Co., the Jersey group's fleet stood on January 1, 1956, at 100 ocean-going tankers with another 35 tankers on order. The Standard-Vacuum Company's fleet (a company owned equally by Standard (N.J.) and Socony Mobil) comprised 44 ocean-going tankers of which 27 vessels were on long-term charter.(3) The total capacity of its control-

---

1. Petroleum Statistical Yearbook 1956, p. 302.
2. Ibid., p. 180.
3. Ibid., p. 301.

led fleet is 1,519,564 dead weight tons.[1] The Caltex group (a joint company owned equally by Standard Oil of California and Texas Oil Company) has under its control 59 ocean-going tankers with a total capacity of 881,492 dead weight tons, and had another 49 vessels on charter with a total capacity of 861,029 dead weight tons.[2]

The oil companies do their best to profit from their shipping operations. They register their ships under flags, for which they pay little taxes, and evade high taxation in their home countries. This explains the enormous increase in ships registered under flags of Panama and Liberia.

Another aspect of tankers' ownership is the growing tendency towards private ownership. Independent operators, seeing the profitability of oil shipping entered the tanker business. Henceforth the percentage controlled by them has grown considerably. In 1945, oil companies owned about 57.6 per cent of the world's tanker fleet and independent owners accounted for 42.4 per cent. By 1950, private owners have come to control 53.1 per

---

1. Ibid., p. 289.

2. Ibid., p. 297

cent of the world's tanker fleet, and the oil companies share dropped to 46.9 per cent. By 1954, independent owners have come to control 62.2 per cent of the world's tanker fleet. The Greek shipowners have accounted for a considerable portion in this increase of private ownership. One, however, should not be misled by this increase in private ownership. While oil companies now own one third of the world's tanker tonnage, they charter most of the private owners fleet. They control in that way 85 to 90 per cent of the world's tanker tonnage with the rest being engaged in tramp or spot market business.(1)

TABLE - 42 -

INDEPENDENT VS OIL COS. TANKER FLEET

T-2 Equivalents

	1945	1949	1950	1954	1955
Number of Vessels					
Oil-cos-owned	322.5	599.7	622.4	754.2	1,168
Independent	237.2	470.5	704.2	1,255.5	1,304
Percentage of Vessels					
Oil-cos-owned	57.6	56.0	46.9	37.8	n.a.
Independent	42.4	44.0	53.1	62.2	

SOURCES: Oil Forum, Mid Nov. 1955, p. 464 for the years up to 1955; for the year 1955, The Petroleum Times, Sept. 14, 1956, p. 827.

---

1. Oil Forum, Mid November 1955, p. 464.

In this way, the oil companies still control the world's tanker fleet, and at the same time attain some advantages by chartering. A large portion of their capital is released for other important operations. Secondly, they attain flexibility in their fleet operations caused by variations in demand and seasonal fluctuations. They benefit from the management and skill of private owners in operating large fleets of tankers with efficiency.

B. Onassis Agreement with Saudi Arabia

The Onassis Agreement marks the first attempt by a Middle Eastern Government to exact a share from the profits of shipping the oil. The oil companies have kept for themselves all the profits arising from shipping Middle-Eastern oil, and only in some cases, they shared some of the shipping profits with the owners of their chartered tankers. Prompted by the volume of the huge profits that could be reaped from shipping the oil, Mr. Onassis, A Greek shipowner, negotiated an agreement with the Saudi Arab government for establishing a Saudi Arab tanker fleet.

A Royal Decree was issued incorporating the establishment of a tanker company owned by the Saudi Government and Mr. Onassis, who was to be a minor shareholder. Mr. Onassis had to provide a fleet of 25 to 30 modern tankers with a total tonnage of some 500,000 dead

weight tons. In the beginning, this company will carry the surplus oil which Aramco's tankers cannot accomodate. Aramao was forbidden to enlarge the fleet that it was operating on December 31, 1953. Moreover, it will not be allowed to replace these vessels as they wear out. The important implication of these provisions is that, this company will later on secure a complete monopoly over carrying Saudi oil. The Saudi Arab government, in return, is to collect a royalty of 15.6 d/ton on all oil produced by Aramco and carried by his tankers.(1) Mr. Onassis will carry free any oil belonging to the Saudi Arab government.

The agreement was met with strong opposition by the oil companies. Pressure was exercised on Onassis to drop the agreement, and Aramco objected to the Saudi government, that the terms of the agreement violate its concession. Since then, the Onassis agreement has been allowed to lapse into oblivion, it seems, although it is still subject to arbitration. However, the significance of the agreement lies in the fact, that is, the first attempt by a Middle Eastern government to demand a share in the profits arising in one phase of the oil's industry. To the oil companies, the Onassis agreement brought another threat that aimed at depriving from them a part of their business. Hitherto, the only threat that the oil

---

1. The Economist, "Saudi Arabia's Tankers", Vol. 171, p. 479, May 8, 1954.

industry had to fear was that of nationalization. This danger could be overcome, because the oil companies controlled the transport facilities. However, any agreement of this kind does not only mean that they are deprived a part of their business, but also forewarns that any act of nationalization can become successful, since the government then, does not have to face the problem of moving the oil, as was the case in Iran. This agreement has been described as a..."new exercise in discrimination, and is deplorable and potentially dangerous to all international oil companies in the Middle East. Apart from restrictions it places upon tanker operations and purchasers of Arabian oil, this attempt to exact a share of marketing as well as production and refining products by a Middle East government will inevitably attract serious attention."(1)

Today, of all the Arab oil producing countries, Iraq is seriously thinking of establishing a tanker fleet and sums have been allocated for the execution of this project. How successful the Iraqis' attempt will be, remains to be seen.

---

1. Ibid.

C. Profits from Shipping the Oil

The tanker operators enjoy enormous profits and private owners have become among the richest men in the world. If these private owners have become so rich, what about the earnings of the oil companies who charter the private owners' fleet and operate at the same time their own tankers. A very simple computation shows the huge profits which they try to reap for themselves from moving the oil on their own tankers or on their chartered tankers. It costs about 70 cents a barrel of oil to be transported to Europe, and in that are included the Suez Canal tolls of 18 cents a barrel. This was the rate prevailing before the Suez Crisis, and chartered rates are below that quotation. Moreover, the real cost of moving the oil on tankers owned by the oil companies is much below that figure. However, accepting that figure, and with crude oil selling at $1.97/b at Ras Tannura, and $3/b in Southampton, one gets at a net profit of 33 cents per barrel from shipping the oil only.

III Pipelines and Oil in the Middle East

The question of increasing production in the Middle East is essentially a question of moving the oil to the centers of consumption by the cheapest methods . This is very markedly pertinent to production in Iraq.

Pipelines offered a solution of transporting the oil from the fields of production to the coast of the Mediterranean whereafter tankers move it to the important consuming centers in Western Europe. In Iraq production increased only with the increase in pipeline facilities which allowed for a greater volume of Iraqi production to be moved to the seaboard. Hence, a system of pipelines was established connecting the oil fields with the various export outlets. The most important pipeline systems that need concern us in this study are two: the IPC system, and the TAPLINE system.

Of the 146 million tons of oil exported from the Middle East in 1955, nearly 72 per cent passed through the Mediterranean - 65 million tons in tankers from the Persian Gulf via Suez and 40 million tons through pipelines to ports in the Lebanon and Syria.

TABLE - 42 -

PIPELINES TO MEDITERRANEAN

IRAQ CIRCUIT	CAPACITY 1955 planned (million tons)	
Kirkuk-Banias, 30 inch	16 1/2	33
Kirkuk-Tripoli 12 inch and 16 inch	7 1/2	
Total	24	
SAUDI ARABIA-TAPLINE		
Qaisumeh-Sidon, 30 inch	16	20

SOURCE: private

A. Advantages of Pipelines

The factors underlying the transport of oil by pipelines instead of by tankers are explained by the advantages and savings that pipelines offer over sea transport. Otherwise, oil companies would not have invested huge sums of money in the construction of pipeline systems.

1. Pipelines offer a great saving in time and reduce distances, and therefore result in saving in costs which increase the competitiveness of Middle Eastern oil. For instance, the 1,100 mile Tapline cuts more than 7000 miles of sea transport round the Arabian Peninsula, and thus offering a decisive advantage unimpaired even by the emergence of supertankers.
2. This saving in time resulting from the reduction in distance has an important implication regarding transporting this oil to distant markets. It took a tanker 3 months to make a round trip between the Persian Gulf and the United States East coast, which meant that a tanker could make only four trips a year. After the construction of TAPLINE, the time span for a voyage was cut by 7000 miles, which meant that it became possible to use a tanker on more trips. As

a result, it was possible to reduce the number of tankers needed to transport Saudi Arabian oil by 70 or 80 tankers.(1)

3. Another saving attained by the use of pipelines is that they allow a continuous flow of oil, while a tanker has to make half of its voyages in ballast.
4. Another saving offered by pipelines is the economy in steel, for it was calculated that it required only one third of the steel quantity needed to build a tanker to move the same quantity of oil.(2) This is very important at a time when the world is complaining from a shortage of steel.
5. A further saving achieved from pipelines in the Middle East is the avoidance of paying the Suez Canal tolls of 18 cents a barrel.
6. Another advantage is arising from the use of "Big Inch" pipelines. The larger the pipelines the more is their carrying capacity, since the

---

1. M. Al-Oboussy, Petroleum in the Arab Countries, Arab League, Institute of Arab Studies, 1956, p. 155. not in Bib.
2. Mickessel, op.cit., pp. 65-66.

carrying capacity of two pipes varies as the square of their diameters. Therefore, according to this principle, a 32 inch line can carry four times as much as a 16 inch line. The two original 12 inch crude lines from Kirkuk to Haifa and Tripoli, built in 1934, delivered between them a maximum of about 4 million tons of oil a year. The single 30/32 inch Kirkuk-Banias pipe delivered about 18 1/2 million tons of oil last year. Tapline's line has an average capacity of about 15 million tons and can be boosted up to 27 million tons by more pump-installations.

7. Moreover, the larger the diameter of a pipeline the lower the unitary costs are for pumping stations, power generating plants and general line operation. It was estimated that costs over 250 mile distance of a 10 inch line with a carrying capacity of 20,000 b/d will be 24 cents per barrel. These are reduced to half by the use of a 20 inch line with 80,000 b/d capacity, and would drop below 10 cents if the pipeline is enlarged, by only four inches. According to this principle, TAPLINE's and IPC's pipelines costs won't be more than 4-5 cents a barrel.(1)

---

1. P.P.S., "Era of Big Pipelines", Vol. XIX, No. 7, p. 245, July 1952.

8. In the Middle East, the terrain across which these pipelines run is almost ideal for the purpose; mostly flat desert, presenting no obstacles such as are met when there are large centers of population.
9. Summing up all these savings offered by the use of pipelines, one can safely say that such systems of transport pay on their investment. "The two Big-Inchers built in the U.S. (1,250 mile line from Longview, Texas, to Phoenixville, Pennsylvania, and a 24 inch, 1485 mile line from Beaumont, Texas, to Bayonne, New York) yielded the U.S. government which has them built, a net return within less than three years of $180 million, compared with their total investment of $145 million". TAPLINE, accordingly, should have acquired by now a net return more than it originally invested.

B. Profits from Operating the Pipelines

The earnings from the pipeline systems in the Middle East could be considered as equal to the cost of shipping an equivalent amount of oil by the longer tanker haul round Arabia through Suez, less the cost of operating the pipeline and amortisation on the capital investment.

On that basis, by taking the f.o.b. price of Arabian crude at Ras Tannura of $1.97 per barrel, and the price at Sidon of $2.46 per barrel, the savings made by Tapline are forty three cents a barrel. The savings made by IPC are 59 cents a barrel ($1.87/b at FAO and $2.46 at Banias). The prices of crude at the Mediterranean ports are established in such a way, that they cover exactly the extra cost of shipping round the Arabian Peninsula. In 1947, it was estimated that tanker costs from the Persian Gulf to the Mediterranean were in the order of 45-58 cents a barrel and pipeline costs were at about 18 cents a barrel, and thus resulting in a net saving of 30 cents a barrel.(1) Put in other words, pipelines save two-thirds of the costs of carrying oil by tankers around the Cape.

An objective observer, however, should not be contented with these results for at least two reasons: in the first place, shipping quotations are not representative of the true shipping costs, since each oil company uses its own rate, which is below the market rate, and secondly the costs of operating the pipelines are usually inflated. According to the previous estimate discussed on page 175 it was found out, that cost of transporting crude by IPC's or Tapline's systems cannot be more than

---

1. I.P.C., oplcit., p. 369.

four cents a barrel. This is confirmed from the results obtained by a private interview with the responsible people in TAPLINE.[1] Therefore, according to that, the net savings of Tapline are about thirty-nine cents a barrel for crude transported in its system. On a throughput of 15 million tons a year, TAPLINE's profits are $ 45 million.[2]

C. The Syrian Formula

There have been many disputes between the oil companies on the one hand, and the transit countries, about the computation of the pipeline earnings. Controversies have arisen and many solutions were offered. The Syrian formula which was adopted as a basis for computing transit earnings represents a model of one of the various solutions for this problem. The Syrian formula rests on two principles, first the volume of

---

1. The writer was told that TAPLINE's operating costs were about LL 12 million a year. Dividing this by the total throughput of 15 million tons, it costs 1/3 ↑ 80 piasters a ton, or 11.42 Lebanese piasters a barrel, or about 5 cents a barrel, to move the oil.

2. This is at a rate of 40 cents a barrel.
40 million tons x 7.5 112.5 million barrels
112.5 x 40 cents = $45,000,000.00

oil in transit, and secondly the length of the pipeline in the transit country. "The expression "the Ton-Mileage Element" shall mean in relation to any year a sum in sterling calculated in accordance with the following procedure.....the quantity in tons of crude oil passed in transit in Syria, multiplied by the number of miles in Syria and divided by hundred."(1) The rate is established at one shilling and four pence sterling per one hundred ton-miles. Another similar tariff was established for the pipeline terminal.

The Syrian formula was based upon the costs of carrying oil by tanker, and of a pipeline extending from the head of the Persian Gulf to the Mediterranean, since there being no direct tanker outlet for Kirkuk oil. The oil company considered tanker costs as corresponding to the price differential between prices on the Persian Gulf and those in the Mediterranean. This differential amounted to 25/5d per ton.(2)

---

1. Supplementary convention with the Syrian government dated 27th November 1955, Article I, paragraph d) and sub-paragraphs (I) (II) and (III).

2. From an I.P.C. Memorandum to the Syrian Government No. D/2 dated 29th of November 1955.

To this, the company added a margin of 25 per cent making a total of 31/10 d. per ton against rise in tanker freights. (Although the company, took the cost of operating its own tankers as a basis and this is not affected by tanker rates). The distance from Basrah to Banias being 800 miles, the pipeline tariff would be 4/d per ton per 100 miles and the amount of the tariff applicable to the section of the Banias pipeline in Syria (which covers a distance of 300 miles) would therefore be 12/-per ton.(1) In addition to this, there would be a terminal tariff of 4/3d. per ton. The costs of operating the pipeline and the terminal would be 4/6 cents and 2/2d respectively,* and hence transportation profits would be 7/6d per ton on the Banias pipeline and 2/1d. per ton on the terminal.(2)

On that basis, the company offered the Syrian Government a fifty-fifty split of the profits. According to the terms of the formula, these would amount to 1/4d per hundred ton miles for the pipelines and 1/1d for the terminal.(3) On an estimated throughput

---

1. Ibid.

2. Ibid.

3. Ibid.*According to the company's Memorandum, these included operating expenses and overheads, and depreciation at the rate of 10% per annum and amortisation at the rate of 5% per annum. (These included the non-operating lines to Haifa)

of 18 1/2 million tons in the Banias line and 7 1/2 million tons in the Tripoli lines, the Syrian Government would receive for 1956 a sum total of approximately £ 6,060,000 plus other dues. (For further details see appendix).

According to this complicated Ton-Mileage formula, the Syrian Government received a sum total of £ 6,547,333 compared to £ 908,000 that would have been received under the old agreement. Thus the Syrian Government achieved an income seven times and a quarter more than that achieved under the old agreement. To this should be added the price differential of £ 270,000 as a result of buying crude oil from the company at a reduced price (1), when a refinery is erected and plus another £ 8 1/2 million for dues since 1952. However, one cannot proudly say that the Syrian Government is an ideal solution for the problem of transit oil. It suffers many shortcomings (which will be discussed later) and ignores many other considerations. One of the losses to the Syrian Government was that of foreign exchange which the company used to hand in to the Exchange Office at the official price. In 1954 the government's gain from this source amounted

---

1. Supplementary Convention, Art. 11, para. (c), sub-para. (b).

to 8,724,122 Syrian pounds. However, the Syrian officials

TABLE -44-

SYRIAN OIL ROYALTIES

(£ Sterling)

1947	75,000	1952	223,145
1948	75,000	1953	352,748
1949	75,000	1954	365,994
1950	75,000	1955	n.a.
1951	108,000	1956	6,547,333*

* Estimate

SOURCE: private

were contented to this, since it represented the maximum that they could get at the present from the company. An official said that they had accepted the company's formula because, on the one hand, they did not know what the true profits were, since they did not have access to the company's books, and on the other hand, they would take this as a basis for further demands in the future.

TABLE - 45 -

DELIVERIES OF IPC TO EXCHANGE OFFICE

	£	Average Price of in Free Market*
1949	1,445,100	n.a.
1950	1,967,075	957
1951	5,053,050	907
1952	4,200,305	945
1953	3,416,714	985
1954	3,207,398	988

*official price 616S.P/£

SOURCE: private

D. Lebanon's Position and the IPC Formula

Interesting enough is Lebanon's position with the IPC. Negotiations with the Lebanese Government have reached a stalemate position. The Lebanese position rests wholly on one principle and that is the right of way which the government surrenders to the company. Without acquiring this right, the company cannot build its pipelines, and, henceforth, achieve any profits or benefits. Taking this principle as a guide, the Lebanese oil policy was outlined on the following bases:(1)

1. That the net saving from carrying oil by pipelines to the Mediterranean Sea instead of its carriage by tankers from the Persian Gulf to the Mediterranean Sea be regarded as the net profits of the company from pipelines and terminal operations.

2. That the net profits from the pipelines ending in Tripoli be divided on a fifty-fifty basis between the company on the one hand, and Lebanon and Syria on the other hand.

---

1. Quotations from the Lebanese Government's memorandum to IPC December 28th, 1955.

3. That Lebanon and Syria should share equally the part of the profits accruing to them from the Tripoli pipelines irrespective of the length of the pipelines in each of their territories. This was based on the idea of right of way and stemmed out from the fact that the lines length in Lebanon are only 20 miles, while in Syria they are 263 miles long. According to the Ton-Mileage formula, Lebanon would be at a disadvantage.

In its reply to the government, the company accepted the fifty-fifty sharing of profits, but insisted on the application of the Ton-Mileage formula. But the Lebanese Government rejected the Ton-Mileage formula for the following reasons:(1)

1. The Lebanese Government believes that the length of the pipeline has no bearing on the gross profits arising from the transportation by pipe rather than by tanker, and that it affects the net profits only in so far as the cost of operating the pipeline must be deducted from the gross profits.

2. The Lebanese Government further believes that it is ONLY OF THE RIGHT OF WAY granted by the transit countries that pipelines can be built, which make possible the transportation of oil by a cheaper

---

1. Quotations from the Lebanese Proposal of the Division of Profits of January 13, 1956.

method than by tankers, and therefore that the profits can arise. Consequently, these profits must be attributed to the transit countries and shared between them and the company on a fifty-fifty basis.

3. Since the profits arise from the right of way irrespective of distance, the share of the transit countries in the profits should be divided equally between them.

4. The application of the Ton-Mileage formula of the Syrian Agreement is contradictory to the preceding three considerations. In the first place, it reserves 5/8 of the profits on the pipeline on the ground that 500 miles of the 800 miles imaginary Basrah-Mediterranean pipeline would be in Iraq, and allocates to the transit countries only 3/4 of the profits. The Lebanese Government believes that all profits are realized in the transit countries without whose permission no pipeline can be constructed and operated to carry the oil to the sea. Obviously it is to the interest of Iraq, as an exporting country and the company, to transport oil by the most profitable route to its European markets. They are not entitled therefore to any transportation profit from any length of pipeline in Iraq. In the second place the formula implies that the remaining 3/8 of the profits are to be divided between Syria and Lebanon in proportion to

the length of the pipeline in the two countries. This is clearly unjustifiable since by giving the company the right of way, Lebanon is entitled to an equal share as a transit country.

5. There is a basic fallacy in the Ton-Mileage formula in that Lebanon, the country which makes it possible for the company to reach the Mediterranean, in the shortest and most profitable way is penalized on that account. This contradiction becomes evident when it is considered that whereas the profitability is greater, the shorter the pipeline's length in the transit countries, the formula makes the share of those countries greater the longer the pipeline in their territories.

Based on these arguments, the Lebanese Government made a counter-proposal to the Company for sharing profits. However, this proposal was based on the company's cost estimates in its agreement with Syria.

1. Gross Profits

Tanker Operating cost	25/5d.
- 25% margin	6/5
	31/10

2. Operating Costs

fixed over-all costs ton in respect of entire system in Syria & Lebanon	4/6d.
fixed over-all costs from Kirkuk to Syrian border ($\frac{250}{300}$ miles)	4/
	8/6d.

3. Net Profits — 23/4d per ton

The net profit is to be divided equally between the Company on the one hand and Syria and Lebanon on the other hand. This makes Lebanon's share 5/10d. per ton. But the Company refused the Lebanese Proposal on the following grounds.(1)

1. The company cannot agree that any profit arises from the mere grant of a right of way. Profits arise from the operation of the pipelines and are necessarily dependent on the distances involved. A transport undertaking would be unable to charge as much for transporting goods over a short distance as for transporting the same goods over a longer distance. Consequently profits are essentially a function of distance, as well as of tonnage transported. For this reason the Company does not agree that there is any fallacy in the ton/mileage formula.

2. Secondly, the Company is paying Syria 1/4d per ton - miles in respect of pipeline transportation based on the formula. This in respect of the Tripoli lines which cover some 263 miles of Syrian territory, Syria received approximately 3/6 per ton. To give Lebanon the same would mean that Tripoli oil would be burdened with a payment of 7/d per ton in

---

1. Quotations taken from the Company's "Memo on the Lebanese Government's Proposal" dated 13th January 1956.

respect of the pipeline transportation from the Iraqi border to the sea as against 4/ per ton on oil to Banias.

As a result, negotiations reached a dead lock and the Government imposed retroactive income taxes on the company and the company threatened to stop its operations in Lebanon and threatened to move out of the country.

E. I.P.C.'s Profits According to Lebanon's Estimates

According to the Lebanese proposal IPC's profits from operating the pipelines are 23/4d. per ton. On a throughput of 7 1/2 million tons in Lebanon, the company's profits would be in Lebanon £4,375,000 or about L.L. 39 million. To this should be added the terminal profits in Lebanon of about £729,166 or L.L. 6,560,000. (Gross profits/ton cost of Fao terminal; 4/3d. less 2/2, cost of operating Tripoli terminal/ton, net profits 2/1d.) Total profits would be L.L. 45,560,000.

TABLE - 46 -

ROYALTIES ACCORDING TO LEBANESE PROPOSAL

	£ Sterling
1. Transit fee, 5 10/12d. per ton for 7 1/2 million tons	2,187,500
2. Terminal Fee	379,150
3. Loading Fee	87,500
4. Other Fees	456,850
TOTAL	£ 3,111,000

SOURCE: Private

Lebanon would receive according to its proposal a sum total of £3,111,000, or the equivalent of L.L. 28 million; compared with the company's offer of £ 566,650 according to the ton-mile formula. (Royalties according to the old agreement are:

TABLE - 47 -

Royalties According to the Company's Offer

	£ Sterling
1. Transit fee 1 1/3 shilling/100mile-ton 3 1/5d. per ton/20 miles for a throughput of 7 1/2 million tons	100,000
2. Terminal fee 1 1/12d. per ton for 7 1/2 million tons	379,150
3. Loading fee 3d./ton	87,500
TOTAL	566,650
* Protection fee and Price differential from sale of crude	300,000
	866,650

SOURCE: Report on Negotiations between the Lebanese Government and IPC, 28th December 1955 to January 21, 1956, (January 23, 1956), p. 4.

Since the company refused the Lebanese counter-proposal, the govenment imposed retroactive income

taxes. On the company's total profits of L.L.45,560,000, the treasury would receive the sum total of L.L.23,500,000 in the form of taxes.

TABLE - 48 -

OIL ROYALTIES FROM IPC ACCORDING TO TAX IMPOSITION

(L.L.45,560,000)

1.	Income Tax at 42%	LL 19,000,000
2.	* 10% municipality	2,000,000
	TOTAL INCOME TAX	21,000,000
	* Loading fee 3/ton and other taxes	2,500,000
	TOTAL	23,500,000

SOURCE: Private

According to another estimate made by a Lebanese expert, the company's profits are L.L. 58,031,242. On this basis, Lebanon would get an income of L.L. 26,810,300, if income taxes were imposed. This estimate is based on the cost of operating pipelines from Kirkuk to the Persian Gulf, and then adding to them the costs of operating the tankers.

TABLE - 49 -

IPC'S PROFITS ACCORDING TO EXPERT'S ESTIMATES

1. Cost of operating pipes from Kirkuk to Distance 460miles			
for 300 miles	4/6		
for 460 miles	6/10		
2. Cost of operating the tanker	31/11		
3. Savings by pipelines	38/9		
4. Less cost of operation from Kirkuk to Mediterranean	8/3		
Cost from Iraq to Mediterranean		4/6	
Cost from Kirkuk to Syrian border		3/9	
$\frac{250}{300}$ x 4/6		8/3	
5. Net Profits/ton	30/6		
6. Profits in Lebanon - 50%	15/3		
7. Total Profits from pipes 15 1/3 x 7 1/2 million tons		£	5,718,750
8. Terminal Profits			729,166
9. Total Profits from Terminal		£	6,447,916
		LL	58,031,242
10. Income Tax 42%			24,373,000
11. - 10% Municipality			2,437,300
12. Lebanon's Income from income tax			26,810,300

SOURCE: Private

E. The Future of Pipelines in the Middle East

In order to be fair and objective, one has to present the other side of the picture. True, pipelines earn huge profits for their proprietors, but there are factors which would make the future of pipelines a somewhat unprofitable or even a losing venture, and would limit their expansion in the Middle East. Pipelines are meeting very strong and keen competition from tankers. There is a very strong controversy about pipelines versus tankers in the Middle East. With the coming of giant super-tankers with a carrying capacity up to 100,000 tons that would by-pass the Canal and avoid paying 18 cents per barrel, pipelines are faced with a very strong competitor. "What all of this means is that future costs of moving oil from Persian Gulf points to points west of Suez will be controlled by the costs of operating a fleet of large, efficient, economical tankers, furnishing low-cost transportation in competition with pipelines."(1)

A tanker has an added advantage over pipeline because of flexibility. Thus, it could be rerouted or carry other forms of cargo, if one route

---

1. George S. Colbey, Jr., "Will More Pipelines be Built in the Middle East?" Reprinted from The Oil Forum, March 1954.

should become unprofitable. On the other hand, a pipeline is a completely fixed and immovable facility. Once a pipeline is built in a certain area it is there to remain forever.

Another element which might limit the expansion of pipelines in some countries of the Middle East is the dwindling of profits to pipeline operators, because of the rising demands for more royalties by the transit countries. It is urged that, "Governments in the Middle East, who are constantly raising the ante on pipeline companies for transit royalties, should realize that they are helping to drive pipelines out of business."(1) It has been even maintained that "Lebanon's conduct has been scarcely less highhanded or inimical to a rational development of Middle East oil potential than was Nasser's action."(2)

However, the most important element for the possible limitation of the construction of pipelines in these countries arises from the fear of political risk. Indeed, Syria's attitude, "may be taken as

---

1. Ibid.

2. A. Murphy, op.cit., p. 84.

ominous portents of the vulnerability of the pipelines ....and may conceivably lead to its by-passing in future expansion plans."[1] This is what leads the major oil companies to give serious thought to plans for the construction of two huge pipelines that would carry to the Mediterranean oil from Kuwait, Iran, and southern Iraq. These pipelines would have a capacity of 1,700,000 barrels a day and would cost about $ 1 billion. They would pass through Iraq and Turkey. "The principal attraction of the Turkish detour is that the crude would flow through the territory of two staunch Western allies who are members of the NATO and Baghdad alliances."[2]

IV. Refining Middle Eastern Oil

Refining is an integrated part of the oil industry. Crude oil is not wanted for its own sake, but for the sake of the various products derived from it. To the oil producing countries of the Middle East, the question of refining is of utmost importance. The issue has arisen because of the tendency of oil companies to build refinereies in the consuming markets rather than in the producing centers. This is very markedly the case in the Middle East. It has been a

---

1. Ibid.

2. Ibid.

PRESENT & FUTURE REFINERY STATUS OF NEAR & MIDDLE EAST

LOCATION	OWNERSHIP	BARRELS PER DAY (OPERATIONAL)	CHARGING (BUILDING)	CAPACITY (PLANNED)
ADEN COLONY: Little 'Aden	BP Refinery (Aden) Ltd.	120,000	-	120,000
BAHREIN ISLANDS: 'Awali	Bahrein Petroleum Co. Ltd.	205,000	-	205,000
EGYPT: Alexandria	Proposed special company with co-ops	-	-	10,000
Cairo	Government Oil Administration	-	40,000	40,000
Suez	Anglo-Egyptian Oilfields Ltd.	44,000	-	47,000
Zeti (Suez)	Government Oil Administration	9,000	-	30,000
IRAN: Abadan	National Iranian Oil Co.	270,000 (1)	-	400,000 (1)
Isfahan	Iran Oil Co.	-	-	5,000
Kermanshah	National Iranian Oil Co.	4,300	-	4,300
Masjid-i-Sulaiman	National Iranian Oil Co.	5,140	-	5,140
Qum	Iran Oil Co.	-	-	500
Teheran	Iran Oil Co.	-	-	5,000
IRAQ: 'Alwand	Government Oil Refineries Administration	11,000	-	11,000
Basrah	Government Oil Refineries Administration	3,530	-	3,530
Baba Gurgur (Kirkuk)	Iraq Petroleum Co. Ltd.	13,500 (2)	-	13,500 (2)
Daurah (Baghdad)	Government Oil Refineries Administration	25,000	-	40,000
Haditha (K.3)	Iraq Petroleum Co. Ltd.	1,000	-	1,000
Qaiyarah	Government Oil Refineries Administration	2,000	-	2,000
ISRAEL: Haifa	Consolidated Refineries Ltd.	28,000 (3)	-	85,000 (3)
JORDAN: Zirkah	Government and private interests	-	-	6,000
KUWAIT: Mena Al-Ahmadi	Kuwait Oil Co. Ltd.	30,000	160,000	170,000
LEBANON: Saida (Sidon)	Mediterranean Refining Co.(Caltex)	9,000	-	9,000
Tripoli:	Iraq Petroleum Co. Ltd.	11,500	-	11,500
QATAR: Umm Said	Qatar Petroleum Co. Ltd.	600	-	600
SAUDI ARABIA: Ras Tanura	Arabian American Oil Co.	210,000	-	210,000
Mena Sa'ud	Getty Oil Co.	-	-	10,000
SYRIA: Homs	Government and private interests (SORI)	-	-	16,000

SOURCE: Oil Forum, December, 1956.

(1) Refinery only partially restored to service; peak throughout capacity was 595,000 barrels per day.

(2) Also located at Kirkuk is 650,000 barrels per day.stabilization plant which was partially operated as a refinery during World War II.

(3) Refinery only partially restored to service; peak throughout capacity was 85,000 barrels per day.

(4) Required by concession terms.

postwar phenomenon that instead of processing the crude oil in the Middle East, the oil companies have tended to build their refineries in Western Europe and imported crude from the Middle East to run them. Consequently, while production in the Middle East, totalled 120,26 million tons of crude oil in 1953, its total refining capacity did not exceed 32,7 million tons, including refineries in non-producing countries. The Arab League has shown recently an interest in the subject and has called for a conference to discuss it.

A. Present and Future Refinery Status of theMiddle East

The first refinery to be erected in the Middle East was that built by the Anglo-Egyptian Oil fields Ltd. in Suez in 1913. The second refinery was also built in Egypt in 1922, by the Egyptian Government. These have been enlarged considerably since they were first established in order to meet the local demand. Today total capacity of both refineries is about 44,000 barrels a day (See Table).

In Iraq, up to 1952, there was only one refinery established by the Khanquin Oil Company, a subsidiary of Anglo-Iranian established in 1927 with a

total capacity of 3000 barrels a day. In 1952, the State took over refining and marketing of petroleum in Iraq. The government oil refineries administration built a refinery at Daurah with a total capacity of 25,000 barrels a day, and two other refineries at Alwand and Basrah with a capacity of 11,000 and 3,530 barrels daily for each respectively. This enabled Iraq to meet its inland consumption of petroleum products.

On the Persian Gulf, Caltex established the BAPCO refinery in Bahrein, in order to supply its markets in India and the Far East. Its initial capacity was at 10,000 barrels daily. Its capacity was increased to 65,000 barrels a day during the war in order to meet the Allies military demands in the Far East. Today, it has become one of the biggest refineries in the Middle East, with a total daily capacity of 205,000 barrels. Most of its throughput of crude is imported by the marine pipeline from Saudi Arabia. For war purposes a refinery was established at Ras Tannura. Today its total capacity has reached 210 barrels a day, and most of its products are sold in the Far East and South Africa. However, the largest operating refinery in the Middle East was that of Anglo-Iranian at Abadan. Today, it is

partially in operation and has a total capacity of 270,000 barrels a day and a planned capacity of 400,000 barrels daily. Prior to nationalization its peak throughput capacity was 595,000 barrels a day. Anglo-Iranian, in order to compensate for the loss of Abadan refinery, built another one at Aden protectorate with an operational capacity of 120,000 barrels a day. Elsewhere on the Persian Gulf, there are some small refineries of negligible output designed to meet local requirements.

In the non-producing countries in the Middle East, Lebanon is the most notable regarding refinery status. It has two refineries of about 20,500 barrels/day capacity, in Tripoli and Sidon, and these two supply most of the requirements of Lebanon, Jordan, and Syria. Syria has recently leased tenders for the construction of two refineries in that country. Jordan ~~will also have~~ a refinery ~~in the near future~~.

B. Middle East Refining Capacity and World Capacity

Although the Middle East accounts for about 23 per cent of the world's crude production, its refining capacity is only about 8 per cent of the world's total capacity. Moreover, the ratio of refining capacity to total production was only 28 per cent, (1)

---

1. M. Al-Oboussy, op.cit., p. 155.

while in Western Europe total production is only about 10 million tons, its refining capacity is of the level of 120 million tons a year. Why is this pattern taking place? What are the factors which lead Western Europe, for instance, to build a refining industry which depends for its operation on Middle East's crude? Why don't we try to benefit from this industry, since we are the producers of this oil, and hence we have priority to profiting from it?

It was seen, that the major factor that stemmed the building of refineries in the Middle East during the war, was the need of oil supplies for the Allies military operations. With the end of the war there was a shift in the pattern of location of building refineries. This was most notable in the case of Western Europe which started a huge refinery expansion programme after the war. Refining capacity in Western Europe expanded from a pre-war level of 12 million tons a year to about 106 million tons in 1954.(1) This ambitious program was based upon the shift from importing products from the Western Hemisphere to crude imports from the Middle East.

The factors which lead Western Europe to establish its own refining industry are many and varied.

---

1. Ibid.

However, the most important factor was the desire of the European countries to save foreign exchange. This was achieved by the availability of Middle East crude which was cheaper in this respect, and did not involve large hard currency expenditures. Another factor stemmed up from political considerations. Countries of Western Europe wanted to insure their independence in regard to oil supplies in cases of contingencies. In case there is a cut off of crude supplies, it is easier to shift to other sources of supplies and keep the refineries running. It is argued that the Middle East is a strategically vulnerable area in which new large scale refinery investment carries considerable risk. This was exemplified previously by the shutdown of Abadan, and recently by the Suez crisis. A third factor was the availability in Western Europe of facilities for large refining plants, together with the availability of efficient and skilled labor. A fourth factor is that the refining industry created employment opportunity and helped speed up Europe's recovery. A fifth factor is that building the refining industry there helps creating an integrated petro-chemical industry; which is expanding very rapidly in Western Europe. A sixth factor was the desire of the companies to reduce shipping expenses

since it is cheaper to transport one product rather than many products.

These are the factors that called for building processing plants in Western Europe instead of here. However, the advantages of building refineries near the source of crude production reduces overhead expenses considerably, because of the economies of large scale production.

D. Ownership of Refining Facilities

Once again we come to the question of ownership. Who owns the world's refining capacity? Once more, the answer is that most of the world's refining capacity is owned by the seven major oil companies. In 1950, these seven companies owned about more than 47 per cent of the world's refining and cracking capacity.(1) They owned 47 per cent of the U.S. cracking and refining capacity. In Western Europe they owned most of the cracking and refining capacity. These seven companies own practically all the refining capacity in the Middle East and about 84 per cent of the refining capacity of the Eastern Hemisphere. Excluding the refining capacity of the United States and the Communist

---

1. I.P.C., op.cit., p. 25.

countries, this petroleum cartel owned together about 85 per cent of the world's refining capacity.(1) The significance of control over refining is twofold: first, the companies try to benefit as much as possible from integration and hence reap out all profits for themselves from all phases of the oil industry, and secondly, as a corollary from this, they try to control all new industries stemming from refining, especailly the petro-chemical industry.

E. Profits from Refining

Material and information about the oil business' margins from refining are few and scanty. The oil companies try their best to conceal their operations for very obvious reasons. In case any information is revealed about profits, the tendency is to inflate expenses and underestimate profits. However, one is interested in pursuing to what happens to the oil produced in his country. Refining is an important stage, and we should have a picture how much these oil companies benefit from our oil. How much does processing the oil add to its price, and what margins do refineries obtain from processing Middle Eastern oil. Since most

---

1. United Nations, Economic Commission for Europe, The Price of Oil in Western Europe, Secretariat, Geneva, March 1955, p. 31.

of the Middle Eastern oil output is imported by refineries in Western Europe, this study will be based largely on margins obtained from the operations of these refineries. This will show also how much the Middle East has lost from building the refineries in Western Europe.

1. Refining Margins in Western Europe

In an inquiry about the price of oil to Western Europe, prepared by the United Nations, it was estimated that the refinery margin in North Western Europe is $.52 and $.66 in United States Gulf for every barrel.(1) This estimate is based on the saving attained from importing a barrel of crude oil and refining it in Western Europe rather than importing refined products.

The picture in the following table is not entirely accurate and representative of the true margins of European refineries. In the first place, prices of products are based on the Gulf of Mexico prices, which are higher than f.o.b. prices of Middle East oil. Moreover, the element of transportation charges make North-Western European refineries less profitable than their counterparts in Southern Europe. In this respect one notices a strange phenomenon, and that is why most of

---

1. U.N. Economic Commission for Europe, The Price of Oil In Western Europe, Secretariat, Geneva, March 1955, p. 31

the refineries have been built in North-Western Europe since they are not very profitable according to the pricing formula and freight charges of crude oil. "The main answer is to be found in the fact that most of Western Europe's refineries are owned by the major international companies which control the production in the Middle East."(1) For these companies, what is important is not the f.o.b. price of crude oil, but rather the cost of production, and this is very low in the Middle East. This is why even most of the refineries on the East coast of the United States operate on cheap crude imported from the Middle East. Moreover, since the largest part of this crude is carried by tankers owned or chartered by the major producing companies, the cost of transportation is considerably below current spot freight rates. "Indeed for an intergrated company the allocation of profit between crude oil production and refining is merely a matter of internal bookkeeping."(2) These major oil companies own three quarters of the refining capacity of Western Europe.

---

1. Ibid., p.32.

2. Ibid.,

TABLE - 51 -

NORTH WESTERN EUROPEAN REFINERY MARGINS

(dollars per barrel)

Product	Price f.o.b. Texas	Transportation	Delivered Price	% Yield	Weighted Delivered Price
Gasoline	4.41	0.78	5.19	26.2	1.360
Kerosene	3.57	0.86	4.43	2.1	0.093
Dist. fuel oil	3.41	0.91	4.32	20.4	0.882
Res. fuel oil	1.75	0.99	2.74	51.3	1.406
TOTAL				100.0	3.74
Crude Petro	1.93	1.29	3.22		3.22
Refinery Margin					0.52

SOURCE: The Price of Oil In Western Europe.

Another factor which has to be taken into consideration in computing refinery margins, is the quality of crude oil and the percentage yield of the various major products. Western Europe needs fuel oil, and the Middle East crude is the most suitable for that, since

it contains a high percentage of residual and distillate fuel oils. This concentration on extracting heavy fuel oils which command a lower price tend to

TABLE - 52 -

PERCENTAGE YIELD OF REFINED PRODUCTS
IN FIVE MAJOR AREAS

AREA	GASOLINE	KEROSENE	DIST. FUEL OIL	RES. FUEL OIL	TOTAL
U.S. Gulf	51.9	8.5	25.7	13.9	100
S. America	16.6	6.1	16.2	61.1	100
Middle East	21.8	11.3	20.2	46.7	100
N.W. Europe	29.4	4.7	20.2	45.7	100
S. Europe	24.9	6.1	21.2	47.8	100

SOURCE: The Price of Oil in Western Europe.

depress the margins of Western European refineries. However, with the development in refining techniques and the production of high specialty products such as petro-chemicals, which net high profits, refinery margins are augmented. Moreover, these products have not been taken into consideration in the United Nations study.

After allowing for some adjustments (but not including the latter factor), it was found that every barrel of Middle Eastern oil processed in Western European refineries netted a margin between $0.84 and $1.00 (see table 53). A comparison of refinery margins in the world's major producing years show that these are highest in the Middle East. Refinery margins in the Middle East have been well above those in all other producing areas in the world, including the high United States refinery margins. This gives a fresh proof to the advantage of locating refineries in the Middle East rather than elsewhere.

TABLE - 53 -

ESTIMATE REFINERY MARGINS
IN MAJOR PRODUCING AREAS

(U.S. $/B)

OCT.15 DATE	U.S. GULF	SOUTH AMERICA	MIDDLE EAST	NORTH-WEST EUROPE	SOUTH EUROPE
1948	.75	.76	1.12	0.50	0.90
1949	.84	.13	.92	.43	.72
1950	.98	2.33	1.14	.48	.86
1951	1.02	0.35	1.18	0.37	1.04
1952	1.08	0.27	1.05	0.45	0.98
1953	1.06	0.43	1.05	0.87	1.05
1954	.82	.37	.97	.84	1.00

SOURCE: The Price of Oil in Western Europe

It is on this point that the efforts of the Arab Governments should be made. They should compell or persuade the oil companies to build their refineries here instead of building them in Western Europe, and Australia. The refining industry could benefit the countries of the Middle East considerably, and speed up its economic development. For, after all, why should Europe reap all the profits from refining our oil and we are denied from them, while we are the producers of the oil? The minimum the governments could do is that they require that a certain portion of the crude produced should be refined locally. We are not the first to attempt that, for Venezuela has already provided a law in that respect.

F. Petro-Chemical Industry and Middle East Development

One of the fields in which oil is becoming prominant is the petro-chemical industry. It is mainly for securing more widely available and generally cheaper, supplies of raw materials, that chemical manufacturers are turning increasingly to petroleum. In 1955, the U.S. produced about 15 million tons of petrochemical products and worth a value of $4000 million. (1)

---

1. P.P.S., "Petro-chemical Panorama", Vol. XXII, No. 8, p. 292, August 1955.

This represents 12 times the rate of output in 1939. Outside the United States, the petro-chemical industry is well-established in Canada, the U.S.S.R., the U.K., and is gaining prominance in Western Europe.

"Krilium" - a petro-chemical product, discoverdd recently, has striking effects on plant growth and the control of erosion. It is a synthetic resin in the form of a plastic powder. It is to rearrange the soil particles and to stabilize the physical structures of soil, in order to facilitate aeration, water penetration and moisture absorption, and thereby to enhance the effects of fertilizers and natural soil nutrients. One pound of krilium equals in efficiency 200 pounds of peat-moss, and 500 pounds of commercial compost, but is at least 10 times as resistent to decomposition by soil micro-organisms.

This new product is a fresh proof of the petro-chemical industry's increasing contribution to the advance of modern agricultural science. Modern research is constantly finding new uses for petroleum products in chemical and industrial processes. In 1900, there were only 30 chemists who were research workers on petroleum refining and manufacture. In 1950, there were about 15,000 research scientists in the U.S. on

the petroleum chemical industry.[1] Up to the present time, over 200 chemicals extracted or built up from petroleum have been used in the preparation of more than 1000 different products. Of 10,000,000 of organic chemicals produced throughout the world in 1954, 50 per cent were derived from petroleum and natural gas. The petro-chemical and natural gas industries are far more profitable than crude production or selling refined oil. "On the average, a ton of crude petroleum used in petro-chemicals would net an income over seven times as large as that netted from the sale of crude."[2]

This industry is rapidly expanding and increasing in importance. The chemical industry in the U.S. derives 30 per cent of its raw materials from petroleum. The petro-chemical industry is growing at the rate of 14 per cent per annum, while other branches of the chemical industry are increasing at the rate of 10 per cent per annum.[3]

Here is a vast and rich opportunity for economic development in the countries of the Middle East. Development of a petro-chemical industry is sufficient

---

1. P.P.S., "Research and Petrol-chemical Expansion", vol. XVII, No. 7, p. 198, July 1950.

2. Sayigh, Yusif, "Arab Oil - A Second Look", Middle East Forum, vol. XXXII, No. 1, p. 10, January 1957.

3. Ibid.

enough to bring to a prosperous position the countries of this part of the world. It is an industry which is still in the stage of development but has very high profitable promises in the future. Its development will not only bring forth a new industry to the Middle East, but will instigate the birth of multiple of other industries, which either stem from it or become fe asible by its establishment. Here is a field for industrialization in which the Middle Eastern countries have the best natural endowment and will fulfill for its hungry nations its long-aged dream of industrial development. No other industry, not even the automobile industry, will give rise to a varied and numerous increase in economic activity, like the petro-chemical industry. If the Middle East concentrates on the development of this industry, it can assure itself a prosperous future, and at the same time insure itself against a possible decline from present-day income from oil.

Of course, there are many obstacles to the development of such an industry in the Arab World. One of these factors is the lack of technical skill, but this is not a very serious problem, and experience shows that Middle Eastern skill could be trained and adapted very easily to the most complicated technical jobs, notably in the oil industry. There is the

opposition of strong industrial interests, notably in Western Europe. These will be expected to wave much violent opposition against any such project, that might in the future deprive them some of their business. These in conjunction with the oil companies, which own through subsidiaries and affiliates practically all the petrochemical industry in Europe and the U.S., will probably exercise a high pressure opposing the establishment of a petro-chemical industry in the Middle East. The Middle East is more favorably situated than Western Europe in the field of this industry. Being the crude producers, the Middle Eastern countries will enjoy advantages over industrial concerns in Western Europe, because of cheaper production costs, resulting from the absence of transporting the crude, cheaper labor costs, and after all, no foreign exchange is involved. But given real willingness and determination on the parts of the local governments, these could exercise a counter-pressureon the oil companies, for after all, who is at the mercy of the other of the two groups? If private national capital is not willing to go into this business, because it is not acquainted with it, the local governments should at least persuade if not force, the oil companies to start establishing such an industry in our country, instead of establishing it abroad. After all, these industries in the

West feed on our oil, and there is no reason why it should reap for itself all the benefits from such an industry and we are denied from them while we have the priority to gain from our soil's oil.

Practically all Arab countries, except for Iraq, have not been aware of the importance of this industry. The prospects of such an industry should be brought to the attention of our governments. Interest of private capital should be aroused and careful studies should be conducted in the hope of starting this industry as soon as possible.

V. Investment of the Oil Industry in the Middle East

The tremendous development of the oil industyy in the Middle East called for the investment of large sums of capital. The volume and the nature of capital investment is an important indicator of the high profitability of Middle Eastern oil operations. However, it has been very difficult to obtain exact information about this subject, since the oil companies do not publish such information on the one hand, and secondly since the companies over-estimate the rate of depreciation of their assets, and this reduces the real value of their capital investment and their profits.

The first investment in the oil industry was made in Egypt, when the Anglo-Egyptian oilfields Co.*

---

* Now nationalized.

TABLE 54

FREE WORLD PETROLEUM: ESTIMATED OF AGGREGATE CAPITAL EXPENDITURES 1946 TO 1955
(Million Dollars)

	Production	Pipe-Lines	Refin-eries	Market-ing	Other	Total
U.S.A. *	26,575	2,235	5,050	2,870	275	37,455
% of Total U.S.A. *	71	6	13	8	2	100
Canada	1,720	345	485	370	50	2,970
Venezuela	2,491	161	503	44	19	3,218
Other W. Hemisphere	669	69	455	270	53	1,516
W. Europe	115	15	1,673	855	102	2,760
Africal	115	0	34	186	15	350
Middle East	980	587	465	75	333	2,440
Far East	565	8	540	500	33	1,464
Total excl. USA *	6,655	1,185	4,155	2,300	605	14,900
% of Total excl. U.S.A. *	45	8	28	15	5	100
Total Free World *	33,230	3,420	9,205	5,170	1,330	52,355
% of Total Free World *	64	6	18	10	2	100
Tankers	-	-	-	-	-	3,920

* Excludes all investments in tankers.

Source: P.P.S., February, 1957.

was founded with a capital of £ 676,000. This has increased to £ 1,808,000 in 1950, and £ 3,777,000 in 1954.(1) However, the real value of its capital was much above this figure, for in 1950 its fixed assets were estimated at £ 8 million and the replacement cost by about £ 16 million.(2)

In Iraq, the Turkish Petroleum Company started with an initial capital of £ 50,000. When it acquired the concession in 1955, its capital became £ 1 million, and increased until it became £ 5 million in 1931. With the construction of pipelines and the export of Iraqi oil, the company's capital increased to £ 8 million in 1935, and continued to increase, especially after the construction of the Big Inch line to Banias and the large scale growth in production, until it reached £ 83.5 in 1950.(3)

The capital investment of the I.P.C.'s affiliates in other parts of Iraq totalled £ 26.53 million

---

1. M. Al-Aboussi, op.cit., p. 166

2. The Egyptian and Economic Review, November 1954.

3. Mohammed Yeganeh, "Investment in the Petroleum Industry of the Middle East", Middle East Journal, Vol. 6, No. 2, p. 245.

in 1950. As for the company's subsidiaries in the rest of the Middle East, their total capital investment amounted to £ 19.9 million in 1950, of which £ 11.2 million were invested in Qatar, £ 5.7 million in Syria, £ 1.6 million in the Trucial Coast, £ 0.8 million in Lebanon and £ 0.6 in Jordan.(1)

In Bahrein, the company started with an original investment of $100,000. The Caltex Group which was formed in 1936 to carry on the marketing operations had a capital stock of $1 million. By the end of 1946, Caltex had accumulated reserves and surplus amounting $118.8 million. By the end of 1950, their capital surplus amounted to $254.2 million. The present value of investment in the oil industry of Bahrein is about $170 million.(2)

In Saudi Arabia, Standard Oil of California, started with an original investment of 50 thousand dollars.(3) When the Concession was obtained, the capital investment of the Arabian California Oil Co. was $700,000. Today, Aramco's capital investment

---

1. Ibid.
2. Ibid.
3. Shwadran, B., The Middle East Oil and the Great Powers, (Frederick Praeger, 1955), p. 348.

stands at about $800 million, including investment in the TAPLINE.(1)

In Kuwait, the original capital of the Kuwait Oil Company was $200,000. At the end of 1951, Gulf's equity share in it was about $65 million, which means that the Company's capital stood at $130 million. (Since Gulf owns 50 per cent of Kuwait's oil).

1. Investment in Middle East's Oil and World Oil Investment

The high profitability of Middle Eastern Oil is ascertained by the fact that it took only 5 per cent of the world's total investment in the oil industry to produce about a quarter of the world's production and locate more than 75 per cent of the world's crude reserves in the Middle East.(2) Since the end of the war, up to 1956, the oil industry incurred a total capital expenditure of about $52,355 million. The United States accounted for more than two-thirds of that total. Out of this total, the Middle East accounted for only $2,440 million which is about 5 per cent of total capital expenditures.

---

1. Private information

2. A. Murphy, op.cit., p. 83.

Capital expenditures in the Middle East were even less than those incurred in Canada over the same period of time. (See Table 54) While Canada produced only 22,800 thousand metric tons in 1956 as compared with a total output of 171,817 thousand metric tons in the Middle East, total capital expenditures in the oil industry were $2,970 million as to a total of $2440 million in the Middle East. The same line of argument can be applied to Venezuela where production there totalled 129,000 thousand metric tons and capital expenditures amounting $3,218 million.

The picture becomes more interesting when expenditure figures are dissected according to various phases of the oil industry. Less than half of total capital expenditures in the Middle East were for production, ($980 million), while other phases of the industry accounted formore than $1460 million. Pipelines represented a big item of capital expenditures in the Middle East totalling $587 million or more than the total capital outlay on production. Another heavy item of expenditure is that incurred in providing facilities which are not present in underdeveloped areas.

The United States companies accounted at the end of 1955 for 47 per cent of gross petroleum investment in the Middle East[1] while other interests ac-

---

1. P.P.S., "Oil Investment Dissected", Vol. XXIV, No. 2, p. 56, Feb. 1957.

counted for the other 53 per cent of gross investment. However, in 1952, U.S. companies accounted for 63 per cent of the capital investment in the Middle East, and British capital accounted for 21.87 per cent and Dutch and French capital accounted for 12.50 per cent. The reason for the decline of America's share in total capital expenditures is due to the increased capital expenditures of British companies notably the affiliates of IPC on exploration in the Persian Gulf protectorates.

2. Capital Gains

Though there are no available data whatsoever on the capital gains of the oil companies operating in the Middle East, one can get an indicative picture of the immense profitability of the investments that were made in the oil industry in the Middle East, from the comparison of some figures. We remember that Standard Oil of California's original investment in Saudi Arabia was only $700,000. In 1936, Standard of California sold its half interest in its concession to Texas Oil Co. for $21 million. This makes the value of the companies assets then at $42 million dollars, thus achieving a capital gain of about 420 per cent over the original investment. This happened at a time when there was no commercial production of oil. When we know

that it cost Standard New Jersey and Socony Vacuum about half a billion dollars to get a 40 per cent share in Aramco, we get a good picture of the capital gains attained from the original humbel investment of $700,000.[1]

Standard Oil Company (N.J.) made a down - payment in cash of $76,550,000 for its 30 per cent share and similarly Socony Mobil Oil Company paid $25,500,000 for its 10 per cent interest in Aramco. In a current investigation by the U.S. Senate, these two companies were charged that "they got their money back from Aramco in little more than a year. By 1956 they got back more than their original investment."[2]

Another example of the high capital returns on investment in the Middle East is that attained by Standard Jersey from its 1/8 share in I.P.C.'s oil. The Company estimated the value of its assets in the I.P.C.'s concession area only to be between $119 million and $143 million in 1937, while its total investment did not exceed $14 million up to that period.[3] What this amounts to is that the real value

---

1. Shwadran, op.cit., p. 348.

2. Oil and Gas Journal, "Tax Probe Hits Aramco", Vol. 55, No. 12, p. 117, March 25, 1957.

3. I.P.C., op.cit., pp. 95-6.

for its capital investment has increased between 850 and 1021 per cent.(1)

We should remember that all these capital gains were obtained at a time, when the Middle East was still a minor producer. How much have they multiplied after the tremendous increase in production and after the discovery of most of the world's reserves there, remains to be known.

VI. Buyers of Middle Eastern Oil

We have seen that the same oil companies that own production in the Middle East own the transport and refining facilities. An important question arises in the question of marketing Middle Eastern oil, and that is, who buys Middle Eastern oil? One should not be surprised that the buyers of Middle East's crude are the same group that controls its production. These own 3/4 of oil refineries in Western Europe, which operate on Middle Eastern crude. To the oil companies the important thing is not the profits on production or transportation or refining, but the resulting profits from marketing. To them the allocation of profits between the various stages of the industry is simply a matter of bookkeeping transfers. Hence it is to their advantage to see that all the crude produced by their affiliates would not be bought by

---

1. Ibid.

outsiders.

In the Middle East, the producing companies act simply to extract the oil and deliver it to their share-holders; each according to its percentage of ownership. This is the function of both companies, IPC and Aramco. However, due to the nature of joint ownership of production in the Middle East, and in order to prevent any outsiders from obtaining any part of the surplus of any company, the major oil companies have entered into sales agreements to sell to each other any surplus production on long term contracts. This is another aspect of the International Petroleum Cartel's efforts to monopolize the World's oil industry. "The sales of oil covered by the contracts can often be utilized as an instrument to divide production, restrain competition in marketing, and protect the market positions both of the buyer and the seller." They aim at listing "who may or may not buy crude oil from particular producing properties."(1) These selling agreements tend to harmonize production policies with marketing monopolistic policies. "They tend to keep surplus supplies of crude oil out of the hands of independent oil companies."(2) In the Middle East, several agreements of

---

1. Ibid.

2. Ibid.

this nature were negotiated between the major oil companies and which are mostly concerned with the selling of crude output from the Persian Gulf protectorates.

1. Gulf-Shell Agreement - 1947

This agreement was signed between Gulf Oil Corp. and Shell Petroleum Co., a subsidiary of Royal Dutch Shell, on May 28, 1947. In brief, the contract provides for the selling of practically all the Gulf's share in Kuwait production to Shell. The Contract's duration will extend over twenty-two years, frm 1947 to 1969, and could be renewed afterwards indefinitely. Total deliveries to be made under the terms of the contract are about 1 1/4 billion barrels of oil, and ranges from 15,000 barrels daily to a maximum of 175,000 barrels later on.(1) This explains the increase in production in Kuwait since 1947 to 1951 from 30,000 barrels a day in 1947 to 380,000 barrels a day in 1951. After that year, Kuwait's production shot up considerably, because of the loss to Anglo-Iranian of Persian oil.

2. Jersey Standard-Anglo-Iranian Crude Oil Sales Contract

Another selling agreement of monopolistic nature was negotiated between Standard Jersey and Anglo-

---

1. Ibid.

Iranian and signed on September 23, 1947. Under this contract, Anglo-Iranian would sell to Jersey about 106,400,000 long tons (about 800,000,000 barrels).[1]

Anglo-Iranian agreed to supply this quantity from its surplus production in either Iran or Kuwait. "This flexibility option was inserted to allow Anglo-Iranian to determine the source of supply as indicated by political considerations."[2] The contract was to last for 20 years and Anglo-Iranian had to deliver at the rate of 90,000 barrels a day for the first three years and at the rate of 114,000 b/d for the succeeding 7 years, and the rest of the quantity contracted to be determined at a later period. "The crude oil sales contract, therefore implied a long-term close association between Jersey Standard and Anglo-Iranian."[3]

3. Socony-Anglo-Iranian First Purchase Agreement

The Socony Vacuum Oil Co., Inc., made a sales contract with Anglo-Iranian for the pruchase of crude oil by the former from the latter's surplus production in Iran and Kuwait. Anglo-Iranian promised to deliver to Socony a total quantity of oil of 26,000,000 long

---

1. Ibid.
2. Ibid., p. 148.
3. Ibid., p. 149.

tons (200,000,000 barrels) over a 20 years period.[1] During the first ten years Socony was to obtain half the balance at the rate of 2800 b/d and the rest of the balance to be determined later.

4. Socony-Anglo-Iranian Second Purchase Agreement

Finding that supplies under the first contract are not sufficient to meet its needs for its markets, especially in the United States, Socony negotiated another sales contract with Anglo-Iranian on March 1, 1948. Socony bought from the latter a total quantity of oil of 40 million tons (300 million barrels) over a 20-year period.[2]

It is to be remembered that the execution of all the three above mentioned agreements were pending on the construction of Middle East Pipeline from the Persian Gulf to the Mediterranean. However, since there were difficulties in obtaining a way-leave from Syria and Iraq, the pipeline was never built. Hence the parties agreed that the crude bought by them to be lifted by tankers at the Persian Gulf ports. Supplementary Agreements were signed for that purpose, and the contracts became effective since 1952.

---

1. Ibid., p. 152.
2. Ibid.

5. The Off-Take Agreements with Aramco

When Socony and Jersey Standard joined Aramco they made an Off-Take Agreement (12 March 1947) with Caltex, (joint marketing company of Standard Oil of California and Texas Oil Co.) This agreement "set up a schedule of annual minimum quantities of crude which each of the parties would take (or) buy from Aramco over a period of 18 years."(1) It stipulates that each partner should take according to its pro-rate share in Aramco's production, and was set at 380,000 barrels per day in the first year and increased to 500,000 barrels in the 18th year. It seems that this figure is under-estimated, because Aramco was producing nearly twice that figure in 1955.(2) "If an outsider wished to purchase any crude or refined products produced by Aramco, such purchases had to be made from the owners and not directly from Aramco."(3) This agreement pended the execution of TAPLINE. Meanwhile another interim off-take agreement was concluded to enable Jersey and Socony to buy crude from Aramco in 1947, 1948, and 1949. A third off-take agreement was signed regarding the purchase of refined products from

---

1. Ibid.
2. IPC, op.cit., p. 126.
3. Ibid.

Ras Tannura Refinery.

The Off-Take Agreements regulated Aramco's production, prices, and determined buyers of Aramco's crude and allocated cost of production among the owners of the company.

VII. Pricing of Middle Eastern Oil

The growing importance of oil as a source of basic energy supplies has created a lively and increasing interest in recent years in oil pricing. More specifically, the way under which Middle East oil prices are set has been subjected to much talk, inquiries, and controversies.

Throughout its history, the pricing structure of Middle East oil has maintained a close link to the American pricing structure. Henceforth, any change in U.S. oil prices was immediately reflected by a similar change in the price of Middle East oil. "The doctrine has been that there is a homogeneous market for oil, and that a single structure of prices should conform to the conditions of demand and supply at any given time."(1)

There were no published prices of Middle East oil by the oil companies prior to World War II. "This was indeed an unnecessary procedure under the 'import parity' system, then in force."(2)

---

1. Economist, "What Price Oil?" February 26, 1955.

2. S. Yari, op.cit., p.215

Under this system, crude oil was priced upon delivery as if it originated in the Carribean area and irrespective of the source of origin. Hence, the f.o.b. price of Middle East crude changed with the country of destination. "In certain cases there was the paradoxical situation of importing countries being charged more for Persian Gulf oil, the nearer they were situated to the source of that oil."(1)

The war situation forced the oil companies to leave "the import parity" system because the needs of the Allies made the American and English governments exert pressure on the oil companies to reduce their prices. Middle East crude oil was now bing priced on a new "basing point", Under this system f.o.b. posted prices of Middle East oil were homogeneous to posted prices f.o.b. the Gulf of Mexico. However, the oil companies were forced to reduce the posted prices of Middle East oil under pressure from E.C.A. which was making oil.procurements for Western Europe under the Marshall Plan.

Ever since 1949, Middle East crude prices have been based upon what is called the "equalization point" theory. In that year, the price of Middle East crude of 36 A.P.I. gravity was set at $1.75 per barrel f.o.b. Persian Gulf ports. That was about 80 cents lower than Gulf of Mexico price of crude of the

---

1. Ibid.

same quality. At that price Middle East crude would reach Europe or the U.S. at about the same price for comparable Venezueland crudes. It was argued that since Middle East oil, now, supplies the whole of Europe and even reaches the United States, it cannot be sold at a different price from the delivered price of comparable Caribbean crude at the same point. "In other words, the f.o.b. price of Persian Gulf crude could not be lower than the delivered price of American crude minus cost of shipment from the Persian Gulf to the East coast, and the American tariff on imported crude." What this system really meant is that it made the c.i.f. price of Middle East oil equal to that of American oil and harmonized world oil prices, since Carribbean oil is priced on the basis of Gulf of Mexico quotations. For the same reasons, the posted prices at the pipe-lines' terminals are based on prices in the Persian Gulf ports plus tanker charges to the Eastern Mediterranean without taking into consideration the savings made by the pipelines.

This pricing system has been attacked as being most unrealistic and does not take into consideration many factors. The fictitiousness of the system has been pointed out by the fact that, whereas freight rates have fluctuated considerably, the posted prices of Middle East crude have remained stable. "Actually the curve of oil imports to the U.S. does not show any relation to the freight market."(1)

---

1. Ibid.

However, most of this criticism against the pricing of Middle East crude has come from circles in Western Europe. A question often raised is why the price of Middle East crude should be ultimately related to that of U.S. crude, when Middle East production costs are lower. Western Europe has come to depend on the Middle East for its oil supply. It is maintained that the oil prices have not reflected such a major change in the oil industry and the sources of its supply. Why should Western Europe be tied to Western Hemisphere prices, rather than costs of getting, carrying and refining Middle East crude?"(1)

In order to understand this precarious situation, one has to keep in mind the fact that the buyers and marketers of Middle East oil are themselves the producers of that oil. To them, posted prices mean nothing and these are "a determinent for only a small part of crude supplies, that is, the part sold to 'outsiders!"(2) To these oil companies, "The payments involved are largely bookkeeping operations", since practically most of that oil is sold to themselves or to their affiliates." Their decision on marketing the crude depends on its production cost rather than on its

---

1. Economist, op.cit.,

2. S. Yari, op.cit., p. 217

posted price."[1] In fact, this is what is practiced under the various contracts between the oil companies for the sale of crude oil. The "Gulf-Shell" contract for the sale of Gulf's share of Kuwait output to Shell does not state any price, but rather an elaborate system of the division of profits ac cruing from Shell's marketing that oil is followed." The profits are determined and shared for the entire integrated process of producing, transporting, refining, and marketing."[2] Under the Jersey Standard-Anglo-Iranian (now British Petroleum) contract, the price to be paid is to be calculated according to a "cost-plus" principle, "described in the contract as a cost-plus basis; independent of market fluctuations in the prices of crude oil or petroleum products."[3] The cost element included cost of production and gathering to be delivered f.o.b. tanker ship. In case delivery is made in a Mediterranean port, the cost of pipeline transportation is included. Moreover, a fixed sum is payable per ton of crude oil for all the quantities bought

---

1. Ibid.
2. I.P.C., opcit., p. 161.
3. Ibid., p. 149.

under the contract.[1] Under the Socony-Anglo-Iranian second Purchase agreement, the price charged for this oil was determined by a cost-plus principle adopted in the previous contracts; however, it provided for a profit sharing element. The cost element was determined in the same manner, as that of the Jersey Standard contract. "The plus element was one third of the difference between the total average cost per ton of the oil delivered f.o.b. tankership or at a Mediterranean terminal and the average open market value per ton of oil at that point."[2]

The significance of these contracts is that they give a further evidence on how arbitrarily Middle East oil prices are set. Moreover, they restrict competition between the pruchaser and the seller in that these contracts include clauses defining the territories in which the oil sold could be marketed. If Gulf wanted to compete with Shell, it would be penalized in two ways: its deliveries to Shell are reduced[3], and would share in any losses

---

1. It is to be noted that the actual charges were not available, even for a U.S. Senate inquiry.

2. Under the first agreement the "cost-plus" principle was adopted

3. Ibid., p. 157

resulting from price cuttings. Hence, all these factors have led to a highly controversial issue about the way under which posted prices of Middle East oil are set. However, from a Middle-Easterner point of view, it is to the interest to the Middle East oil producing countries to see that prices are maintained at a high level, since oil royalties in all these countries are calculated on the basis of these prices. Perhaps it may be to the disadvantage of other countries to have Middle East oil prices set in such a manner, but it seems to be to the advantage of the Middle East oil producing countries. Maybe it is ironical to end this study by praising one aspect of the oil companies' monopolistic operations, but one cannot deny the fact that the Middle East benefits from higher prices of its oil.

APPENDIX

Pipeline Tariff

Tanker operating cost: 25/5d. per ton
plus 25% margin: 6/5d. " "
31/10d.

Distance Basrah to Mediterranean say 800 miles

Thus pipeline tariff based on tanker operating cost $\frac{100}{800}$ x 31/10 4/- per ton for 100 miles

Pipeline distance in Syria say 300 miles

Thus pipeline tariff for section Iraq border to Mediterranean, i.e. 30" line to Banias
3 x 4/- 12/- per ton

and for 12"/16" lines to Tripoli
$\frac{263}{283}$ x 12/- per ton 11/2 per ton

(pipeline distance Iraq/Syria border to Tripoli.....283 miles of which 20 miles in Lebanon.

Terminal Tariff 4/3d. per ton

Estimated Throughput (in 1956)

To Banias 18.5 m.t.
Tripoli 7.5 m.t.
Total: 26.0 m.t.

Operating Costs

Fixed overall cost per ton in respect of entire system in Syria and Lebanon
Pipeline: 4/6d. per ton
Terminal: 2/2d. " "
Total : 6/8d. " "

Allocation of pipeline costs on ton/mile basis-
Syria: 304 x 18.5 5624 million ton/miles
263 x 7.5 1972 " " "
7596 " " "
Lebanon: 20 x 7.5 150 " " "
7746

Thus total pipeline cost in Syria
26 million x 4/6 x $\frac{7596}{7746}$ = £5,736,716

Formula Yield to Syrian Government

Pipeline Tariffs 18.5 m.t. @ 12/-	£ 11,100,000
7.5 m.t. @ 11/2	4,187,500
	15,287,500
Cost (as above)	5,736,716
Profit:	9,550,784
50%:	£ 4,775,392

Terminal Tariff 4/3 per ton
Cost 2/2 " "
2/1

Profit: 18.5 m.t. @ 2/1	£ 1,927.083
50%:	£ 963,541

Rates for Convention

Ton/Mileage .....1/4d. per 100 ton/miles yielding (for 7596 million ton/miles)	£ 5,064,000
Terminal .....1/1d. per ton yielding (for 18.5 million tons)	£ 1,002,083

Estimated Government Receipts for 1956

Ton/Mileage Element	£ 5,064,000
Terminal Element	£ 1,002,083
Consolidated Port Dues (18.5 m.t. @ 3d. per ton)	£ 231,250
Security	£ 250,000
	£ 6,547,333

SOURCE: Letter from I.P.C. to the Syrian Government, No. D/2, dated November 25th 1957

CHAPTER VIII

MIDDLE EAST OIL -
IS IT A VITAL NECESSITY TO THE WESTERN WORLD ?

It needed two world wars to flood light the crucial importance of oil in our mechanized age. The bombers and fighters in the skies, the battleships upon the seas, the tanks and armored vehicles on the ground, all fed on one type of oil or another. War demonstrated that adequacy of oil supply is an important element in military strategy and may mean defeat or victory in battles and campaigns.

Yet in peace a similar volume of oil is constantly required for every day use. It speeds up technological changes, extending the realms of the combustion engine and the laboratories. In peace or war, then, no modern factory could operate without petroleum. Without it no machine products turned out by factories could perform the tasks for which they were made. If petroleum has become a necessity of life as we live today, it has become, as well, the promise of a better way of life for all the world tomorrow .

Since oil has gained such an important rôle in the progress of humanity, is it safe to place the

future of the world, especially those societies whose existence now depends on the existence of oil, on this material alone? In other words, has the world done something about finding substitutes and alternatives for oil in case there is a sudden cease in its flow? Yes, nations, especially in the West, have given considerable attention to developing alternatives to oil. Such an alt ernative as resorting back to coal as a source of power has been fully discussed. Unfortunately, it was found that, although coal reserves are more abundant than those of crude oil, coal production is meeting many obstacles which have resulted in the decline of output in the major coal producing areas. Besides, coal has proved itself to be incompatible in meeting the mounting energy needs of the Western world, and has given way to oil. Other substitutes, of which synthetic oil production from coal and oil shale, have been fully studied and assessed. But it was found out that a large scale synthetic oil project would have serious disadvantages as long as both labor and steel are in short supply. Certainly one alternative to the use of high cost fuels is the peace time exploitation of the vast resources of petroleum which exist outside the Western Hemisphere. In the long run, however, the cost of synthetic production may be justifiable in order to achieve

is extremely difficult to find any economically feasible substitutes for it, its availability becomes imperatively important. What nations need that oil more badly than others? What nations have this oil and what nations do not have it? This necessitates a study of the world oil demand and supply picture. Statistics about oil demand and supply reveal (1) the tremendous growth in world production; (2) the gradual recession of the United States from its dominant position, though it still is the world's foremost oil-producing country; and (3) a profound change in the traditional flow of oil. From these remarks, several conclusions come to one's mind, when analyzing the world's needs and supplies of oil.

The first conclusion that comes to one's mind after studying factors affecting supply and demand is that the patterns of supply are changing. At one decade one country is the world's leading producer, at another it loses its lead, and new supplying centers take over. Oil is an exhaustible material, and a country's oil resources are depleted proportionately to its rate of production. At the turn of the century, Russia was the world's leading producer. The United States until the present day, has been the world's unparalleled leading producer. But however, its share in world output has declined and other countries'

share, notably the Middle East, has increased. This all depends upon the rate of discovery. In the future, new oil areas may be discovered, but at the present, the Middle East discovered oil reserves are the largest in the world. Until quite recently, however, the Middle East as an oil producing region has played a relatively minor role in the petroleum economy of the world: up to the end of 1948 only 4.9 per cent of the world's cumulative production of oil had been produced there.(1) However, in the coming decade, Middle East's production is going to surpass that of the United States.

The second striking conclusion that could be gathered, is the concentration of oil supplies in few countries, in which the oil may be needed as the case in the United States; but in most that oil is far in excess of domestic demand as the case in Venezuela and the Middle East. At the same time, that oil is most badly needed in countries which do not posses any oil, as is the case in Western Europe. "To a student of politics the outstanding feature of oil geography is that while the demand for oil is world-wide

---

1. World Oil, "World Production", Vol. 143, No. 3, p. 144. August 15, 1956.

the great sources of supply are few and separated."[1]

Thirdly, in view of the world's mounting future needs of oil, and in view of the world's present proved reserves, the Middle East ranks first as the leading supplier of the world's prospective petroleum requirements. The Western world can no longer depend upon supplies from the United States and Venequela for these are depleting their reserves by a high production ratio. At the same time, consumption in the Western world is increasing ahead the rate of increase in production and the rate of new discoveries. There simply is no other place the free world can get the oil it needs, now and the vast additional quantities it wil need in the future, except from the Middle East. When we look at world figures of production and reserves, we find that the first two important crude producers, the United States and Venezuela are drawing on their reserves while the Middle East contains within its built huge reserves and production is but a fraction of its proved reserves.

The importante of the Middle Eastern oil province depends partly on the immense size of it s total reserves and partly on the high productivity both of individual oil fields and of individual wells. The

---

1. W. Pratt, World Geography of Petroleum, op.cit., p. 389.

occurrence of so many giant oil fields in one area is unique in oil field experience throughout the world.

The rapid expansion of production from the Middle East during the postwar years, and the still greater expansion being planned is the result partly of the inability of the United States fields to satisfy internal demand, and partly, of changing economic factors (reserves exchange problems, costs, which will be discussed later) to the favor of the Middle East.

The world's supplies of oil are inadequate to meet its future demand. The world, especially the West, needs oil, and it needs it badly. There is no other place it can get it, except from the rich oil fields of the Middle East. All this gives force to the conclusion that the Middle East pools have become the balancing factor in equating world supply and demand.

Perhaps the most exasperating fact revealed by supply and demand statistics, that has to be emphasized, is the precarious position of Western Europe though Western Europe is one of the world's most industrialized areas, yet it possesses but very little oil resources. Moreover, Europe's appetite for oil is increasing rapidly. Europe's annual rate of increase in oil consumption has been running about 150/b with indications that it will not drop in the next

the independence from foreign sources. Recently, an Atomic Committee was set up to pool Western Europe's atomic energy resources and coordinate programs for their development. Atomic energy has been examined as a substitute for oil, but it was found out that within the coming two decades, atomic energy will play only a minor part in supplying the world's rising energy needs. Moreover, the field, or the scope of its application has been limited only to a small field in which it could compete with oil, mainly in power stations, and perhaps in shipping propulsion. This field accounts for less than 3 per cent of the total demand for petroleum products. Moreover, the most important deterrant to the development of these substitutes is the capital limitation. These projects require huge capital expenditures, and in the countries where they are most badly needed, capital is scarce, and private initiative has no incentives to undertake such seemingly unprofitable projects. In summing up the prospects for alternatives for oil, one can safely say that there have been found substitutes for oil, but their development is a highly costly proposition in the light of the availability of oil.

Since oil has become so indispensible to the welfare of the nations seeking progress, and since it

ten-year period but may even go higher. The increase in the postwar period of oil demand in the O.E.E.C. countries has risen from 37 million tons (259 million bbl.) in 1947 to 100 million tons (700 million bbl.) in 1955.[1] On the other hand, since after World War II, Western Europe has come to import more than 80 per cent of its oil demand from the Middle East, Western Europe's economy has thus become dependent on that oil, and this is a truth proved by the recent Suez developments. President Nasser's memorable action almost precipitated a world war and started a chain reaction of political and economic events throughout the world, the ramifications of which will be felt for many years to come. "The effect on the productive capacities of all European industries has resulted in higher costs for all products ranging from vegetables for soap to woodpulp for newsprint."[2] At certain times during the crisis Europe's oil imports have been

---

1. Henry C. Rea, "Suez Crisis Reveals U.S. Oil Weaknesses," Oil Forum, Vol. XI, p. 81, March 1957.

2. Ibid., p. 80.

as low as a mere 65 per cent of normal requirements. The Suez crisis was nothing but a vivid example of the growing importance of Middle Eastern oil. Nasser's nationalization of the Canal at the end of July has shown the world, how to a frightful extent the West's economy has become geared to Middle Eastern oil. On the other hand, the Suez crisis has brought another element into the political scene and the already troubled lands and waters of the Middle East. Though the use of this element as a political weapon has proved to be once successful, there is the fear that it might be abused, and that too much reliance on it might prove to be detrimental to the Middle East itself. Indeed, plans for lessening Europe's day-to-day dependence on the Middle East might reduce the importance of such political opportunism.

Ever since the Suez Canal was blocked, the search for new alternative sources for Middle East oil has been accelerated. Consideration of new sources of crude oil supply have shown the determination of Europe to divorce itself from dependence entirely on Middle East oil. New thinking regarding international oil transportation has come up with a trans-Atlantic pipeline from Canada to England; another from Mtwara in Tanganyika to Walvis Bay in South West Africa, another

through Iraq and Turkey; another from Elath at the northern end of the Gulf of Aqaba all through Israeli territory to Haifa on the Mediterranean. There are, however, many obstacles that deter the execution of such projects. But, in the consideration of new and expanded pipeline facilities, it is axiomatic that the political stability of the transit countries will be emphasized and will be the primarily controlling factor.

These experiences throw open the discussion of the question of ownership and control of Middle East Oil. In order to have access to this oil, the West has spread its complete control over the oil resources of the Middle East. Ever Since D'Arcy got his oil concession in Iran, and ever since interest in Middle East oil has begun, the motives for its control have been the same. Forty years ago the Western World had a frightened doubt about the adequacy of its oil reserves. Today, the same motives still exist. Fear from a shortage of oil supply is still an important factor in the struggle for control over the oil resources in the Middle East. This has resulted in a struggle between the various Western powers over the control of the untapped oil resources of the Middle East. The result of this struggle was the emergence of a somewhat international pattern of control, or call it "interest" in the Middle East oil. The struggle for mastery of

the Middle East's oil resources is comparatively recent history, dating from the loss of the U.S.A.'s privileged position as the world's major oil producer towards the close of the last century. Confident of its superior financial power, the United States has slowly and steadily undermined British, French and Dutch influence in the Middle East and eaten into their little shaky empires built upon desert sands full of oil. Hence, Middle East oil cannot be ascribed as having an international aspect according to the pattern of control. Middle East oil has an international aspect in the sense that, except for Russia and the Communist countries, the demand for it, is world-wide.

It is understandable that the need of the oil resources of the Middle East necessitated the spread of its control by the West, but there is a fact which is very ofttten concealed or neglected, and that is the question of ownership. While oil journals will hold at length about the great services that the oil industry does for the advance of the Middle East, little or nothing is mentioned a bout the question of ownership or the economic aspects of Middle Eastern oil operations. Herein lies another factor which makes the West not give up its control over the oil resources of the Middle East. The West has vested interests in Middle East oil and these are powerful interests. The oil

business is thoroughly permeated by monopoly that seven big billion-dollar corporations control the entire oil production in the non-Soviet world and dictate their prices. The Big Seven are led by Standard of New Jersey, which is a bit of an empire in itself, collecting the biggest revenue of any corporation under the sun. It controls only 322 companies. It has become so powerful that it has been said, "What is good for Jersey is the sine qua non of U.S. foreign policy." With such oil empires controlling production in the Middle East, it is understandable that Western oil policy should aim at preserving the oil resources of the Middle East to their rightful owners. Moreover, these companies have found it highly profitable to operate on Middle East oil because of the low cost of production here. The result is that large and persistent disparities have come to exist between the costs and profit margins of the oil industries in the Middle East and other countries.

Foreign companies operating in the Middle East have made substantial net profits on their combined producing, refining, and marketings operations under a system of pricing that (1) bases delivered prices throughout the world on the relatively high U.S. costs, (2) uses schedules of uniform freight charges that may not have any real relationship to trans-

portation costs actually incurred, especially when these companies own or control the bulk of the world's tanker facilities, (3) and is supported and maintained by effort on the part of the major oil companies to adjust production to world demand, joint ownership and private agreements all facilitate these efforts.

All these factors — the growing importance of oil and the inability to find substitutes for it; the facts about the Western World's supply and demand situation; and the rising importance of Middle Eastern oil in supplying the West's present and future consumption of oil; the inadequacy of alternative sources of oil; and the high profitability of Middle Eastern oil operations; — have led to the inescapable conclusion that Middle East oil has become a vital necessity to the Western world.

> "It...(the Middle East)...contains about two-thirds of the presently known oil deposits of the world, and it normally supplies the petroleum needs of many nations of Europe, Asia, and Africa. The Nations of Europe are peculiarly dependent upon this supply, and this dependency relates to transportation as well as to production. This has been vividly demonstrated since the closing of the Suez Canal and some of the pipelines. Alternate ways of transportation and, indeed, alternate

sources of power can, if necessary, be developed. But these cannot be considered as early prospects." (1)

Middle Easterners should be aware of this fact, but at the same time, they should remember an equally important fact. They should be convinced that it is in the interest of the people of the Middle East to recognize the natural economic interdependence between their area and Western Europe.

Europe provides the only practicable market for Middle Eastern oil. The Western hemisphere is still a net exporter of petroleum and neither the remainder of the non-communist world, nor the Soviet bloc, which is now exporting oil, can absorb the Middle East's output.

Moreover, the Suez Canal, the network of oil pipelines constitute a transportation asset that can be profitable to the Middle East only if it is used by Western Europe. If Europeans cannot depend with confidence on the availability of Middle Eastern oil or on Middle Eastern transport facilities, then they will naturally feel compelled to develop alternatives.

The result would be a decline in Western oil

---

1. President Eisenhower, Message to U.S. Congress on January 5, 1957.

purchases and also in the use of Middle Eastern transport facilities — a development that could seriously reduce the income and the prosepects for economic and social progress of states in the area.

However, unfortunately, the situation is more complicated as to be understood only in economic terms. Political factors often undermine economic considerations. But it should be understood, that it is in the interests of all that a fair solution of the problems of the Middle East should be reached.

BIBLIOGRAPHY

BOOKS

Brodie, Bernard, Foreign Oil and American Security. New Haven: Yale Institute of International Studies, Memorandum No. 23, 1947.

Brooks, Michael, Oil and Foreign Policy. London: Lawrence and Wishart, 1949.

Caroe, Sir Olaf, Wells of Power: the Oilfields of South-Western Asia, A regional and global study. London: Macmillan Co., 1951.

Fanning, Leonard M., Foreign Oil and the Free World. New York: McGraw-Hill, 1954.

_____. Our Oil Resources. New York: McGraw-Hill Book Company, Inc., 1945.

_____. American Oil Operations Abroad. New York: McGraw-Hill Book Company, Inc., 1947.

Farough, Abbas, The Bahrein Islands. New York: Jerry Fisher and Company, Inc., 1951.

Feis, Herbert, Petroleum and American Foreign Policy. Stanford University, Food Research Institute, 1944.

Ford, Alan W., The Anglo-Iranian Oil Dispute of 1951-1952. Berkely, 1954.

Gupta, Raj Narain, Oil in the Modern World. Allahabad; Kitab Mahal, 1949.

King, Wilfred, Middle East Oil: Europe's Life-blood. A Special Study reprinted from the Banker, November 1956.

Lebkicher, Roy, Aramco and World Oil. New York: Moore, 1952.

Longrigg, Stephen Hemsley, Oil in the Middle East: Its Discovery and Development. London: Oxford University Press.

Mikesell, Raymond French and Chenery, H.B., Arabian Oil: America's Stake in the Middle East. Chapel Hill: University of North Carolina Press, 1949.

Mielche, Hakon, Lands of Aladdin. translated from the Danish by M.A. Mielche. London: Hodge, 1955.

Pogue, J. and Hill, K., Future Growth and Financial Requirements of the World Petroleum Industry. Petroleum Department, The Chase Manhattan Bank, February 21, 1956.

Pratt, Wallace Everett, ed., World Geography of Petroleum, Published for the American Geographical Society, Princeton University Press, 1950.

Shwadran, Benjamin, Middle East Oil and the Great Powers. New York: Praeger, 1955.

Trans-Arabian Pipeline Co., TAPLINE -- The Story of the World's Biggest Oil Pipe Line. New York: Trans-Arabian Pipe Line Company, 1951.

_____. TAPLINE and the Transportation of Oil. New York: 1956.

Twitchell, K.S., Saudi Arabia. Princeton University Press: 1953.

United Nations, Department of Economic and Social Affairs, Economic Developments in the Middle East, 1945 to 1954. Supplement to World Economic Report, 1933-1954, E/2740 (ST,ECAL 32). New York: 1955.

United Nations, Secretariat, Economic Commission for Europe, The Price of Oil in Western Europe. E ECE 1205. Geneva: 1955.

PUBLIC DOCUMENTS

United Nations Security Council, Anglo-Iranian Oil Company Case Oct. 1951, Security Council Official Records, 559th Meeting Oct. 1, 1951 S/PV. 559.

United States Joint Committee on A tomic Energy, Peaceful Uses of Atomic Energy, Background Material for the Report of the Panel on the Impact of the Peaceful Uses of Atomic Energy to the Joint Committee on Atomic Energy, 84th Congress, 2nd session, vol. 2, Jan. 1956.

United States Senate, Federal Trade Commission, The International Petroleum Cartel, US Senate. Washington: Government Printing Office, 1952.

REPORTS

Arabian American Oil Co., Middle East Oil Development, 4th edition, March 1956.

Arabian American Oil Co., Report of Operations to the Saudi Arab Government, 1950, n.p., n.d.

_____. Report of Operations to the Saudi Arab Government 1951. n.p., n.d.

_____. Report of Operations to the Saudi Arab Government 1952. n.p., n.d.

_____. Report of Operations to the Saudi Arab Government 1953. n.p., n.d.

_____. Report of Operations to the Saudi Arab Government 1954. n.p., n.d.

_____. Report of Operations to the Saudi Arab Government 1955. n.p., n.d.

Bahrein Petroleum Co., Ltd., Annual Report to the Ruler of Bahrein, 1953. n.p. 1954.

Iraq Petroleum Co., Ltd., Working Text of Convention Made With the Government of Iraq on the 14th March 1925, as Revised by Agreements Concluded on the 24th March 1931.

_____. Iraq Oil in 1951. London: 1952.

_____. Iraq Oil in 1952. London: 1953.

_____. Iraq Oil in 1953. London: 1954.

_____. Iraq Oil in 1954. London: 1955.

_____. Iraq Oil in 1955. London: 1956.

Kuwait Oil Co., Ltd., Oil in Kuwait, n.p., n.d.

_____. Kuwait Past and Present, n.p., n.d.

National Petroleum Council, Petroleum Productive Capacity. A Report of Present and Future Supplies of Oil and Gas. Washington: 1952.

ARTICLES

"Focus on Kuwait", Arab World. vol. 10, p. 6-8, April 19, 1954.

"Oil in the Middle East", Arab World. No. 16, p. 24, July 27, 1953.

"An Account of and a Commentary on the Agreement Between Mr. Onassis and the Government of Saudi Arabia for the Establishment of a Saudi Tanker Co,", Economist. vol. 171, pp. 479-480, May 8, 1954.

"Americans and Middle East Oil", Economist. vol. 155, p. 552, October 2, 1948.

"Arabs, Oil and Dollars", Economist. vol. 157, pp. 285-287, August 6, 1949.

"Arab Wealth from Oil", Economist. vol. 170 pp. 591-592, February 27, 1954.

"Baghdad and the Oil Talks", Economist. vol. 160, pp. 865-66 April 14, 1951.

"Baghdad Follows Suit", Economist. vol. 160, p. 733, March 31, 1951.

"By Pass by Pipe Line", Economist. vol. 181, p. 865, September 15, 1956.

"Chemical From Oil", Economist. vol. 179, pp. 1207-9, June 23, 1956.

"Clouds Along the Persian Gulf", Economist. vol. 168, pp. 189-91, July 18, 1953.

"Finding the Dollars", Economist, vol. 181, pp. 983-84, September 22, 1956.

"France's Economy After Suez", Economist. vol. 181, pp. 691-92, November 24, 1956.

"Ibn Saud Lights the Candle", Economist, vol. 160, p. 68, January 13, 1951.

"Illusory Triumph for Lebanon: Your Money - or My Pipe", Economist. vol. 180, pp. 17-18, July 7, 1956.

"Interests in the Gulf", Economist. vol. 178, p. 406, February 11, 1956.

"Lebanon Pipeline", Economist. vol. 180, p. 304, July 28, 1956.

"Middle East Oil Enterprises", Economist. vol. 155, p. 476, September 18, 1948.

"Minds in Perplexity; Target: A Combined Operation", Economist. vol. 176, p. 12, July 2, 1955.

"New Bases for Middle East, Crude Oil", Economist. vol. 168, p. 345, August 1, 1953.

"Oil Compact or Cartel?", Economist. vol. 176, p. 777, September 3, 1955.

"Oil and Leases in Iraq", Economist. vol. 161, pp. 984-85, October 27, 1957.

"Oil and Social Change in the Middle East", Economist. vol. 176, sup. 1-16, January 2, 1955.

"Oil Politics", Economist. vol. 152, pp. 1-3, January 4, 1947.

"Pipe Lines and Pipe Dreams", Economist. vol. 180, pp. 699-77, 1956.

"The Price of Coal", Economist. vol. 176, p. 241, July 16, 1955.

"Reactions to Suez", Economist. vol. 181, p. 304, September 22, 1956.

"Second Thoughts in Saudi Arabia", Economist. vol. 173, p. 2582, November 13, 1954.

"Shall Lebanon Copy Nasser?", Economist. vol. 180, p. 1058, ?29, 1956.

"Squeeze on Sterling", Economist. vol. 181, p. 303, September 22, 1956.

"A Surplus of Oil", Economist. vol. 170, pp. 121-22, January 9, 1954.

"TAPLINE", Economist. vol. 180, p. 471, August 11, 1956.

"Via Suez: Moving Middle East Oil", Economist. vol. 180, pp. 420-1, August 4, 1956.

"What Price Oil?", Economist. vol. 174, pp. 739-40, February 26, 1955.

"When the Pipe Turns", Economist. vol. 181, p. 26, October 6, 1956.

"The Churning in Middle East Oil", Fortune. vol. 50, pp. 124-45, October 1, 1954.

"Embassies of Oil", Fortune. vol. 51, pp. 89-90, May 1955.

"The Great Oil Deals", Fortune. vol. 35, pp. 138-143, May 1947.

"Politics of Oil in the Middle East", Fortune. vol. 53, p. 76, May 1956.

"Suez Bottleneck", Fortune. vol. 54, p. 55, January 1956.

Murphy, Charles, "Oil East of Suez and Nasser's Dreams", Life. vol. 21, No. 10, p. 16, November 12, 1956.

Cooke, Hedley, V., "Foreign Investment in the Middle Eastern Region", Middle Eastern Affairs. vol. 5, pp. 109-115, April 1954.

Melamid, A., "Bureimi Oasis Dispute", Middle Eastern Affairs. vol. 7, pp. 56-63, February 1956.

Yari, S., "The Markets for Middle East Oil", Middle Eastern Affairs. vol. 12, Nos. 6-7, June-July 1956.

Hay, R., "Impact of the Oil Industry on the Persian Gulf Shaykhdoms", Middle East Journal. vol. 9, pp. 361-72, February 1955.

Loftus, John A., "Middle East Oil: The Pattern of Control", Middle East Journal. vol. 2, p. 17, 1948.

Yeganeh, Mohammed, "Investment in the Petroleum Industry of the Middle East", Middle East Journal. vol. 6, p. 241, 1952.

Harvey, John E., "Britain Looks Beyond the Oil Crisis", Oil Forum. vol. 11, pp. 84-85, March 1956.

Katabi, A., "Iraq's Income Pyramids on Oil Revenues", Oil Forum. vol. 9, p. 392, November 1955.

Rea, H.C., "Suez Crisis Reveals U.S. Oil Weaknesses", Oil Forum. vol. 11, pp. 80-83, March 1957.

"Another World Production Record", R.P.S., vol. 19, No. 1, p. 2, January 1952.

"Arrested Growth in Saudi Arabia", R.P.S. vol. 22, No. 9, p. 340, September 1955.

"Ascending World Production", P.P.S. vol. 22, No. 1, P. 3, January 1955.

"Assessment of Europe's Energy Needs", P.P.S. vol. 23, No. 7, p. 255, July 1956.

"Atomic Enterprise", P.P.S. vol. 22, No. 1, p. 8, January 1955.

"Biggest Reserves in Saudi Arabia", P.P.S. vol. 21, pp. 465-66, December 1954.

"The Buoyancy of Demand", P.P.S. vol. 21, No. 11, p. 401, November 1954.

"Case for Synthetics", P.P.S. vol. 17, No. 12, p. 345, December 1950.

"Changing Pattern of European Imports", P.P.S. vol. 17, No. 5, p. 127, May 1950.

"Check to Imports from the Middle East", P.P.S. vol. 23, No. 11, p. 424, November 1956.

"Competing to Explore in Libya", P.P.S. vol. 22, No. 11, p. 408, November 1955.

"Consumption Kaleidoscope", P.P.S., vol. 22, No. 8, p. 278, August 1955.

"The Contribution of Coal", P.P.S. vol. 23, No. 9, p. 323, September 1956.

"Countering the Suez Threat", P.P.S. vol. 23, No. 9, pp. 31_-321, September 1956.

"Criteria of Competitive Atom Power", P.P.S. vol. 23, No. 12, p. 448, December 1956.

"Economic Offensive", P.P.S. vol. 23, No. 3, p. 81, March 1956.

"Energy in Society", P.P.S. vol. 17, No. 7, p. 178, July 1950.

"Europe's Rising Imports", P.P.S. vol. 18, No. 10, p. 335, October 1951.

"Features of Europe's Mounting Needs", P.P.S. vol. 23, No. 10, p. 359, October 1956.

"Freedom of Transit", P.P.S. vol. 23, No. 11, pp. 398-400, November 1956.

"Give and Take in the Middle East", P.P.S. vol. 23, No. 4, pp. 117-118, April 1956.

"Gloomy Prospect for Europe", P.P.S. vol. 24, No. 2, p. 63, February 1957.

"Grappling With the Emergency", P.P.S. vol. 23, No. 12, pp. 433-34, December 1956.

"Hastening Atomic Power", P.P.S. vol. 22, No. 12, p. 433, December 1955.

"In the Fuels Oil Era", P.P.S. vol. 23, No. 8, p. 291, August 1956.

"The Incomparable Middle East", P.P.S. vol. 23, No. 7, pp. 239-41, July 1956.

"Making Atomic Fuels", P.P.S. vol. 21, No. 3, p. 95, March 1954.

"Massive Improvisation", P.P.S. vol. 24, p. 1, January 1957.

"The Middle East Emergency Committee Created", P.P.S. vol. 23, No. 9, p. 346, September 1956.

"The Middle East's Rise", P.P.S. vol. 22, No. 10, p. 366, October 1955.

"New Estimates of World Consumption", P.P.S. vol. 23, No. 6, p. 244, June 1956.

"Oil and Coal", P.P.S. vol. 21, No. 8, p. 278, August 1954.

"Oil in International Trade", P.P.S. vol. 22, No. 5, p. 155, May 1955.

"Oil Investment Dissected", P.P.S. vol. 24, No. 2, p. 55, February 1957.

"The Pricing of Oil", P.P.S. vol. 23, No. 3, pp. 8ç-92, March 1956.

"Releaving the Suez Bottleneck", P.P.S. vol. 23, No. 6, pp. 201-202, June 1956.

"Revelation and Promise", P.P.S. vol. 22, No. 9, p. 314, September 1955.

"Sasol in the Trials of Pioneering", P.P.S. vol. 23, No. 2, p. 58, February 1956.

"Sasol's Sad Sorry", P.P.S. vol. 24, No, 1, p. 23, January 1957.

"Signposing the Future", P.P.S. vol. 23, No. 7, p. 243, July 1956.

"Spain, Synthetic Fuels Hang Fire", P.P.S., vol. 23, No. 10, p. 369, October 1956.

"Steeper Rise in World Production", P.P.S. vol. 22, No. 8, p. 275, August 1955.

"Sterling Ousts Dollar Oil", P.P.S. vol. 17, No. 1, p. 2, January 1956.

"The Suez Artery", P.P.S. vol. 22, No. 11, pp. 401-403, November 1955.

"Suez in Suspense", P.P.S. vol. 23, No. 10, pp. 357-58, October 1956.

"Synthetic Fuel Costs Still Prohibitive", P.P.S. vol. 20, No. 4, p. 141, April 1950.

"Syria: Much Higher Oil Transit Dues", P.P.S. vol. 22, No. 12, p. 446, December 1955.

"Syria Shares in Middle East Advance", P.P.S. vol. 22, No. 5, p. 180, May 1955.

"Tanker Expansion Since Suez", P.P.S. vol. 24, No. 2, p. 65, February 1957.

"Tapline Offers Profit Sharing", P.P.S. vol. 23, No. 8, p. 306, August 1956.

"Towards Arab Economic Unity", P.P.S. vol. 20, No. 12, December 1953.

"Transit Dues for Middle East Pipelines", P.P.S. vol. 23, No. 1, pp. 26-27, January 1956.

"Transit Through Turkey", P.P.S. vol. 23, No. 10, p. 378, October 1956.

"Trans-Persian Products Pipeline", P.P.S. vol. 22, No. 5, pp. 178-79, May 1955.

"U.K. Steel Industry's Oil Consumption", P.P.S. vol. 21, No. 9, p. 348, September 1954.

"Upward Climb of World Oil Production", P.P.S. vol. 20, No. 1, p. 1, January 1953.

"Using Atomic Fuels", P.P.S. vol. 21, No. 4, p. 132, April 1954.

"U.S. Coal to Europe's Rescue", P.P.S. vol. 23, No. 5, p. 180, May 1956.

"U.S. Reserves Sustained", P.P.S. vol. 22, No. 4, p. 120, April 1955.

"U.S.S.R. Plan Fulfilment Promised", P.P.S. vol. 27, No. 7, p. 260, July 1955.

"Venture into U.S. Shale", P.P.S. vol. 24, No. 2, p. 58, February 1957.

"Vigorous Growth", P.P.S. vol. 23, No. 1, p. 1, January 1956.

"What Price Synthetics", P.P.S. vol. 19, No. 1, p. 25, January 1952.

"Work in Saudi Arabia", P.P.S. vol. 23, No. 6, pp. 207-208, June 1956.

"World Production: Again Higher", P.P.S. vol. 21, No. 1, January 1954.

"World Production: New Peak", P.P.S. vol. 18, No. 1, p. 2, January 1956.

"World Production in 1956", P.P.S. vol. 24, No. 2, p. 44; February 1957.

"Britain Regains Her Position in the Middle East", Petroleum Times. vol. 54, p. 1215, November 26, 1954.

Lees, G.M., "The Oilfield Province of the Middle East", Petroleum Times. vol. 52, pp. 95-96, June 1948.

"Middle East Oil in the World Market", Petroleum Times. vol. 59, p. 1283, December 1955.

"Movement of Petroleum Through the Suez Canal", Petroleum Times. vol. 60, p. 181, March 16, 1956.

"The Oil Industry Creates Valuable Export Markets in the Middle East", Petroleum Times. vol. 27, pp. 1149-1154, November 13, 1953.

"The Price of Oil in Western Europe", Petroleum Times. p. 264, March 18, 1955.

Wheeler, K., "Alchemy in the Desert", Time. vol. 65, No. 34, April 11, 1955.

"Long Way Around; Suez Sea Lift", Time. vol. 68, No. 11, September 24, 1956.

"Onassis' Sea Monster", Time. vol. 68, No. 8, July 16, 1956.

"A Review of Oil Output in Various Middle East Countries", World Oil. vol. 129, pp. 225-248, July 15, 1949.

Potter, Frank D., "Kingdoms of Oil: Kuwait", World Oil. vol. 134, pp. 232-234, January 1952.

Dougherty, Tom, "World Energy Requirements", World Petroleum. vol. 28, No. 1, p. 43, January 1957.

Lomax, E.L., "Impact of Oil Revenues on Kuwait", World Petroleum. vol. 27, No. 6, p. 70, June 1956.

_____. "Qatar", World Petroleum. vol. 27, No. 7, p. 65, July 1956.

_____. "The Middle East", World Petroleum. vol. 27, No. 8, July 1956.

Russel, C., "Where Oil Shale Stands Today", World Petroleum. vol. 27, No. 2, p. 58, February 1956.

"Impact of Suez on Europe's Oil", World Petroleum. vol. 27, No. 16, p. 56, September 1956.

"World Royalty Rates", World Petroleum. vol. 27, No. 11, p. 65, October 1956.