

HISTORY OF  
THE SECOND WORLD WAR

UNITED KINGDOM CIVIL SERIES

Edited by SIR KEITH HANCOCK

# OIL

## A Study of War-time Policy and Administration

BY

D. J. PAYTON-SMITH

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## EDITOR'S NOTE

**I**N my introductory note to Professor Court's book on *Coal* published earlier in this series I said that research was in progress on oil, gas and electricity. Subsequently, Mr. Payton-Smith became responsible for the research on oil. This book is the outcome of his studies, completed over a long period as a spare-time task. No other work in the fuel and power field has been carried to the stage of publication. *Oil* will be, in fact, the last volume to appear in the United Kingdom Civil Series of the History of the Second World War.

During the three decades that have elapsed since the outbreak of war, the oil industry has greatly changed: for example, consumption of oil in the United Kingdom has increased eightfold and oil refining capacity almost fortyfold. Notwithstanding these physical changes, the administrative, economic and political problems which this book examines are of continuing significance.

W. K. HANCOCK

## PREFACE

**T**HIS book describes how the vital supply of petroleum products to Britain's Armed Forces and civilian population was directed by British civil servants, and other administrators in and out of uniform, during the war of 1939–45. The story is drawn mainly from official records, particularly the war-time files of the Petroleum Department (incorporated into the Ministry of Fuel and Power in June 1942) and the Tanker Division of the Ministry of War Transport. It is, predominantly, a story of Whitehall's war. Because Britain was the centre of an empire and the British oil industry's operations were on a world-wide scale, Whitehall's administrative concern extended to the supply of vast territories under British control where Allied forces were in action, and to the operation of British-owned oil refineries in the Middle East and other parts of the world. The book describes how Whitehall exercised these responsibilities.

The oil affairs of Commonwealth and Allied countries are mentioned, but only as necessary to elucidate the decisions made in London. Likewise the executive activities of the oil companies and developments within the oil industry are mentioned only where they have a bearing on governmental policies. Where it is necessary for the understanding of decisions the narrative strays into areas more fully covered in the companion series of military histories, but it remains a strictly administrative study. The tankers carrying inflammable cargoes by roundabout routes under enemy attack or the constant threat of it, the pipelines laid across desert and jungle where British soldiers were at grips with the enemy, offer material for a stirring tale of heroism, devotion and technical ingenuity. Very little of this will be found in these pages.

In arranging the material, the author has chosen to weave separate themes—and the dominant one is the shortage of oil tankers—into a chronological sequence. Despite risks to analytical clarity, this approach helps to bring out the drama of events, the uncertainties, urgencies, and stress under which men were working, which would be lost in a purely retrospective analysis. It also helps to a better understanding of the circumstances in which decisions were taken—for instance, how the stages of petrol rationing were related to the worsening shipping situation (which was largely hidden from the war-time public).

Besides the scarcity of tankers and petrol rationing, other themes of the book include the expansion of port and transport facilities to handle oil delivered to unfamiliar places; the evolution of the committee structure through which the Government exercised its



control; and the co-ordination of British arrangements with those of France and the United States. An introductory chapter explains the part played by petroleum products in the pre-war economic life of the United Kingdom. This chapter also shows how Whitehall's approach to the problems of war-time supply was formed by more than thirty years' vain pursuit of self-sufficiency in oil, then regarded as a necessary condition of national security.

An important point needs to be stressed. Work on this series of war histories was initially launched in order to 'fund experience for Government use'. Authors were accordingly invited to write frankly and to use their own critical judgment. Within the pages of this book will be found references to ill-fated policies and decisions, and to differences between departments, and between British officials and those of Allied countries. For his opinions and interpretations the author is, of course, alone responsible. But he would remind the reader that his purpose is to elucidate and not to condemn. That there were mistakes and disagreements need surprise no one. They sprang from the stress and turmoil of war and natural differences of personality, experience and pre-occupation—as well as of different national or departmental standpoints. Indeed, disagreements between partners have a creative part to play in the evolution of effective, i.e. practicable and acceptable, policies.

From the standpoint of the historian it is precisely the points of friction within the general interplay of collaboration that illuminate the strengths and weaknesses of administration. But the reader should bear in mind that the main stuff of co-operative endeavour lay in countless decisions and actions easily agreed to and smoothly carried out. In the nature of things these events cannot be given comparably detailed treatment; and, since they are historically less interesting, such treatment is not required. However, true perspective demands that they should not be overlooked.

In conclusion, the author wishes to record his gratitude for the help he has received from the officials and former officials of the many Whitehall departments that were concerned with oil supplies in war-time. He owes a particular debt to Miss Hilda Merrifield, of the Cabinet Office, who carried out the arduous task of verifying his sources and preparing his text for the printer.

D. J. PAYTON-SMITH

Highgate,

London,

August 1969

## NOTE ON WEIGHTS AND MEASURES

### *Weight/volume conversion factors for oil products*

	<i>Imperial gallons per ton (2,240 lbs.)</i>	<i>Remarks</i>
<i>White Oil Products</i>		
Aviation Spirit—100-octane	315	
—other grades	300	
Petrol (Motor Spirit)		
—petroleum	300	Applicable to imports and Service stocks.
	297	Applicable to deliveries into consumption and civil stocks.
—benzole	255	Applicable to 50 per cent. of indigenous production.
White Spirit	284	
Paraffin (Kerosine)		
—vaporising oil	272	
—other grades	280	
<i>Black Oil Products</i>		
Gas Oil and Derv Fuel	264	
Diesel Oil—ordinary	259	
—marine	250	
Fuel Oil—petroleum	230 to 240	
—tar oils	200 to 215	
Admiralty Oil Fuel	238	Admiralty Oil Fuel consists predominantly of naval fuel oil but includes small quantities of gas and diesel oils.
Gas Diesel and Fuel Oils		
—bunkers	235	
—inland trade	250	
(excluding Derv Fuel)		
Lubricating Oil	245	
Bitumen	216	
Crude Oil	235 to 265	Crude oils vary according to source of supply. 250 suggested as working average for crude and 'process' oils (i.e. lubricating distillates, topped crudes, polymers and octylenes) when taken together in statistical tables.

Note: 35 Imperial gallons=1 U.S. barrel  
42 U.S. gallons =1 U.S. barrel

### *Tanker Measurements*

Gross tonnage is the sum of space (in cubic feet) of all the various enclosed spaces of a vessel divided by 100.

Deadweight tonnage is the number of tons (of 2,240 lbs.) of cargo, stores and bunkers required to bring a ship down from her light line to her load-water line.

In 1939 the gross tonnage of a group of tankers was roughly two-thirds of its deadweight tonnage.

PART I

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The Approach to War

# CHAPTER I

## OIL AND SECURITY

(i)

### The Economic Background

WHEN war began in September 1939 officials in Whitehall had already been at work for more than four years in anticipation of the impending conflict with Germany. Their preparation had naturally included measures to ward off any possibility that Britain's three fighting services, and the economy which supported them, might be halted or slowed down for lack of what had become a vital and virtually irreplaceable commodity—oil. Whitehall's plans to protect and maintain oil supplies in a war with Germany were not, however, created *in vacuo*: they were influenced, sometimes directly controlled, by actions and habits of thought dating back to the First World War and earlier. Awareness of this historical background, and of the complex of economic and strategic factors which shaped it, will help towards a clearer understanding of what was thought and done in the late nineteen-thirties.

But first what exactly is this vital substance and how is it used? The first thing to understand is that it is mineral oil, and not oils derived from animal or vegetable sources, that we are concerned with. Of mineral oil, there is more than one kind. Much the most important is rock oil or 'petroleum' which is found as a natural liquid in the earth's crust. Other mineral oils are shale oil and tar oils which are obtained by extraction from the solid minerals, shale and coal. These last are available in only relatively small quantities; during the war years about one-fifteenth of the mineral oil used in Britain as a fuel or lubricating agent was obtained from shale or coal.

Like all substances used for fuel, mineral oil is composed largely of carbon; it differs, however, from coal and other solid fuels in containing a much greater proportion of hydrogen.<sup>1</sup> It is not, like

---

<sup>1</sup> In bituminous coal the hydrogen to carbon ratio is one to fifteen; in mineral oil one to eight.

water, a single chemical compound, but a mixture of such compounds which are collectively called hydrocarbons. These hydrocarbons differ from one another in two important respects. First, they differ in the form in which they are present in the 'crude oil' (as the original untreated mixture is called) some being gases, some liquids and some solids, according to the size of the molecule. Crude oils from different oilfields contain these various kinds of hydrocarbons in differing proportions, some crudes being 'heavy' and others 'light', depending on whether they contain more or less of the thicker liquid, semi-solid and solid hydrocarbons. Secondly, the various hydrocarbons differ also according to the pattern formed by the atoms in their molecules; and, as they occur in untreated crude, they fall, on this basis, into three separate classes, namely, paraffins, naphthenes and aromatics. Each of these classes of hydrocarbons has its own special characteristics which are of importance in determining the uses to which the oil containing them can be put. These differences are also recognised in the classification of crude oils; some are 'paraffinic', that is, containing a preponderance of paraffin hydrocarbons; others are 'naphthenic': others again may be 'mixed' depending on the extent to which the various kinds of hydrocarbons are present. Aromatic hydrocarbons are present in smaller quantities than the other two, and they are not used for the broad classification of crudes.

Unlike coal, mineral oil is not normally marketed in its natural state. Instead the original crude mixture is first separated out into smaller groups of hydrocarbons. This is done by making use of the fact that the lighter hydrocarbons, being nearer to the gaseous state, will boil and turn into vapour at a lower temperature than the heavier. Thus, if the crude oil is passed through a series of stills, each of which is heated through a different range of temperatures, the hydrocarbons boiling within that range will be distilled off. These separate distillates or fractions, as they are called, differ from one another in colour, viscosity and volatility—that is, readiness to vaporise. After being purified by the removal of unwanted components such as sulphur, the fractions are delivered to the market as 'refined products'.

When, over a hundred years ago, mineral oil first began to be widely used it was mainly for lighting purposes. In fact it was the invention in the middle of the nineteenth century of an improved oil lamp which gave the first stimulus to the growth of the petroleum industry. Mineral oil, being more abundant, was cheaper than the animal and vegetable oils that had had to be used hitherto, and lamps began to spread at the expense of candles among the poorer section of the community. The oil burned in these lamps needed to be volatile so that it would ignite easily, but not so volatile as to be

dangerous to handle. Accordingly, a crude oil fraction distilling approximately within the temperature range of 150° to 300° C., was marketed for this purpose. This product is kerosine, generally called paraffin in Britain.

Down to the end of the last century paraffin dominated the oil market. But there were outlets for other petroleum fractions. From the earliest days the highly viscous distillates at the top of the boiling range had been used as lubricants, first as diluents of, and then as substitutes for the traditional lubricating oils, such as castor oil, which were of non-mineral origin. At the same time solid paraffin hydrocarbons, marketed under the name of paraffin wax, gradually replaced animal and vegetable substances such as tallow and beeswax in the manufacture of candles. Meanwhile, in the closing years of the nineteenth century, the market for paraffin began to change. The demand for it as a household illuminant declined with the introduction, first of gas, and then, after 1880, of electric lighting into private houses. Paraffin lamps became obsolescent, surviving only in rural areas where there was no gas or electricity. On the other hand, paraffin began to be used for heating and cooking and it continued to be burned in railway signal lamps. Even so its use as a 'burning oil' began to dwindle. In the year 1938, about 20 per cent. less paraffin was used in Britain for heating and lighting than had been used in 1900.

The wider use of gas after 1880, however, was not all a disadvantage to the oil trade. For it soon became possible to manufacture town's gas from oil as well as coal. The process made use of a fraction intermediate between paraffin and light lubricating oil which was marketed under the name of solar or gas oil. This gas oil was vaporised in a retort and then mixed in a 'carburettor' with 'water gas', a mixture of carbon monoxide and hydrogen produced by passing steam over red hot coke. This method of gas manufacture was more expensive than the normal method but the plant needed was cheaper to erect and maintain and could be brought into action much more quickly. Therefore many of the larger gasworks found it convenient to use this process to meet the extra loads put upon them at times of peak demand. Down to the First World War the consumption of gas oil steadily grew.

But the most important development for oil refiners towards the end of the nineteenth century was the invention of the internal combustion engine. This works by compressing a mixture of fuel and air at the base of a cylinder on the upward stroke of a piston; the mixture then ignites and burns explosively, forcing down the piston and thus driving the machinery. To operate an engine of this kind either a gaseous fuel is needed, or a fuel which will vaporise easily in order to mix with the air. Such a fuel was provided by the highly

volatile oil distillate boiling in the range below paraffin, that is between about 30° C. to 200° C. Hitherto, this product had been both dangerous and useless and refiners had found it difficult to dispose of. From about the turn of the present century, however, under the various names of motor spirit, gasoline, benzine or, to give it its popular British name, petrol,<sup>1</sup> it rapidly became the most valuable and widely used of all mineral oil products. For the internal combustion engine made a revolution in transport possible. Unlike the steam engine, which relies upon a cumbersome furnace and boiler to provide energy externally, it generates its own power, and is therefore relatively small and light. This makes it suitable as a means of traction for light vehicles. After 1896, when restrictions on the movement of horseless carriages<sup>2</sup> were removed, private and commercial motoring began to increase very rapidly in Britain. In 1900 there were some two thousand motor cars on British roads; by 1939 there were three million petrol-engined vehicles. From about 350,000 tons in 1913, consumption of petrol rose to nearly 3 million tons in 1929, and by a further 2 million in the following ten years.

After the more volatile elements have been distilled off from the crude oil there remains a thick and dark residuum. By the turn of the century this was beginning to create a disposal problem. The obvious solution was to burn it as a furnace fuel. Unfortunately, it did not burn readily. This difficulty, arising from the fact that it does not vaporise, was overcome by the development of a 'spray-burner'. In some countries 'fuel oil' then began to replace coal as a fuel for producing steam. In Britain however, demand for fuel oil did not grow as rapidly as had the demand for other oil products. Gas oil and petrol came to fulfil a completely new demand; paraffin and mineral lubricants first supplemented and then supplanted inadequate native resources. But imported furnace oil had to compete with native coal which was cheap and plentiful. That it was able to compete at all was due to a number of important advantages of fuel oil over coal. In the first place, fuel oil has, weight for weight, a calorific or heating value nearly half as high again as that of the best quality coal. Secondly, since it is fluid, the rate at which fuel oil is fed to the flames can easily be controlled so that the heat output can be varied more quickly than in coal burning furnaces, which also have to be banked up and damped down: all this means that less heat is wasted when oil is being burned, increasing its effectiveness. Thirdly, as well as being more economical than coal, fuel oil can be

<sup>1</sup> 'Motor spirit' is the term now generally used by the British oil industry. The word 'petrol' seems to have originated as a brand name for the motor fuel marketed by a British firm, Carless, Capel and Leonard Ltd.

<sup>2</sup> Locomotives and Highways Act, 1896 (59 and 60 Vict. c.36).

moved about with the aid of a pump and pipelines instead of having, like coal, to be manhandled. Finally, it is cleaner to use than coal and leaves no ash or clinker.

These advantages were particularly valuable in ships, where economy in storage space and ease of handling are of particular importance. By 1914 there were about 500 oil-fired merchant steamers of some half million gross tons on the high seas. There were also a growing number of oil-fired warships. On these the attractions of oil were more than economic. The extra speed and range of oil-driven compared with coal-driven vessels and the ease with which they could be refuelled at sea—impossible except in very favourable weather when coal was the fuel—conferred tactical advantages which no Navy could afford to forego. In 1901 the British Admiralty began carrying out trials of oil-burning warships. By 1909 the British Navy already possessed a flotilla of oil-burning destroyers. In 1912 the keel of the first British battleship to run on oil alone was laid; the vessel was completed in January 1915, more than a year before the first American oil-burning battleship. Meanwhile the Admiralty had also been adapting coal-burning battleships and cruisers to burn oil.

To meet these expanding demands for oil a big international industry grew up in the late nineteenth century. This industry had a highly distinctive structure determined by certain factors inherent in the handling and production of petroleum. One such factor was the need for special transport equipment. In the early days of the trade, petroleum was distributed and marketed, like most other liquid commodities, in containers—in this case wooden barrels and cans; the first consignment from the United States to Britain was despatched in this form in 1860. But as the quantities handled increased, it became uneconomic to transport oil 'packed' (as the oil trade calls it) in this way; containers add to the weight of the consignment, and demand extra labour to fill them. Therefore, at a certain level of trade it paid oil producers to go over to 'bulk' distribution. Oil was moved about on land in specially constructed tank waggons. When very large quantities had to be moved—for instance between oilfield and refinery—it was pumped along specially laid pipelines. Special tank vessels were built for movements by water; tank barges for use on rivers and canals and larger tank steamers for coastwise movements. 'Ocean-going' tankers, each capable of holding millions of gallons, were built for shipping oil across the oceans of the world. The prototype of these ocean-going tankers was launched in 1877 and the first bulk cargo of petroleum crossed the Atlantic in 1886. Along with these bulk transport facilities, huge oil storage tanks had to be constructed to act as transit warehouses on the lines of supply between oilfield and market, at ports and railheads and at

pipeline terminals. Because of the need for this specialised equipment the functions of distribution and production tended to be more closely tied together in the oil industry than in other mineral industries, and gave an incentive to oil firms for extending their activities along the whole line of supply from well to market. In other words, it encouraged them to develop into vertically-integrated units.

Other factors within the industry fostered a different kind of expansion: a horizontal spread at both the producing and the marketing ends. The initial capital outlay required for prospecting and drilling for petroleum, for constructing refining plants, and for building bulk storage and transport, is very high; but the actual cost of producing and refining are comparatively low. Once they have made this initial outlay oil companies have a particularly strong incentive to raise output in order to get the best return on it. This, in turn, has prompted firms to strive for wider and wider markets under the constant pressure of glut. On the other hand, petroleum deposits are not inexhaustible, and persistent over-production has always gone hand in hand with the fear that supplies may dry up. Oil firms have, therefore, attempted to protect themselves by acquiring control over new producing areas in different parts of the world. This policy had an additional advantage for firms with wide-flung marketing territories, since it often opened up sources of supply more conveniently placed for some of these markets.

The tendency for petroleum firms to expand vertically and horizontally was assisted by the facts of economic geography as they existed before the Second World War. Leaving aside Russia, most of the petroleum consumed outside the United States was consumed in Western European countries like Britain, which have little oil of their own. This made it difficult for non-integrated refining and marketing firms, operating entirely within the boundaries of these consuming countries, to maintain themselves in competition with the vertically integrated concerns controlling the sources of supply overseas. On the other hand, apart from the United States, the countries where oil deposits were found were, for the most part, technologically undeveloped and unable to exploit indigenous resources for themselves. As a result, petroleum production owed its development almost entirely to heavy investment from abroad and imported technical and managerial skills. The chief suppliers of this, not surprisingly, were the big petroleum companies who alone could provide the huge initial outlay required to discover and open up new oilfields, and cover as well the risks of developing them in remote, often nomadic areas of the world where their operations could seldom be understood and assisted by most local inhabitants. Accordingly, the control of these companies over crude oil deposits expanded continually.

Thus, the typical unit of organisation in the petroleum industry came to be a fully integrated concern engaged, through the agency of a host of subsidiary operating companies, in every phase of the industry, from the initial search for crude oil down to the delivery of the various refined products to the consumer. It was at once prospector, primary producer and manufacturer, shipowner, merchant and dealer. Organised for large scale operation, it exploited oilfields and worked refineries in widely separated parts of the globe, owning storage and transport facilities in a score of countries or more, in addition to operating a fleet of tankers under a number of national flags. However, these large concerns were not always in all circumstances self-sufficient. A company might produce more oil than it refined or distributed, or it might refine and distribute very much more than it produced. Therefore, a considerable part of its output was shipped in tonnage chartered from specialised ship-owning firms who thus bore the risk of having tankers laid up in times of depression. Finally, in particular countries, an oil company sometimes chose to sell certain products wholesale, leaving to independent dealers the more intricate task of retail marketing. These facts meant that there was still room for the comparatively small non-integrated firm specialising in one or more phases of the supply process. Nevertheless, on the eve of both World Wars, an overwhelming proportion of the world's oil operations was concentrated in the hands of a few integrated international firms, in whose shadow and, largely, by whose favour, the smaller producers, refiners and dealers carried on their business.

(ii)

### The Search for Security before 1914

The conversion of British warships to oil had been unavoidable; without it the Navy would have been outclassed by the fleets of other nations. But it raised a new and apparently grave strategic problem for the British government. Since the abandonment of sail in the mid-nineteenth century, the Navy had drawn its fuel from the coalfields of South Wales whose product was particularly suitable for use in warships. In peace or war it had been able to rely absolutely on this source of supply. There could be no such security when British warships were running on oil. True, there was a small source of mineral oil in Britain. In 1847 James Young, a Scottish chemist, had succeeded in distilling crude oil by heating samples of shale, a clay-like rock which is found over wide areas of England and Scotland.

In 1858—the year before the first petroleum well was drilled in Pennsylvania—his process had begun to be exploited industrially in the Scottish Lothians where suitable deposits had been discovered. But on the eve of the First World War the Scottish shale industry was still producing less than 300,000 tons of crude oil a year, as contrasted with a naval demand for 2 million tons of fuel oil a year in war-time. Nor was there much prospect of increasing domestic output. Shales in various parts of England had been tested and found unsuitable for commercial exploitation owing to their high sulphur content.

Nor could the Government draw much comfort when they looked at other parts of the British Empire. In 1885 the oil bearing regions of Upper Burma had been brought into the Empire; but the other territories appeared to be as deficient in oil as Britain herself. For by far the greater part of its war needs then, the British Navy seemed destined to depend on foreign supplies. To make matters worse it would have to buy them for the most part from firms which were sympathetic—or thought to be sympathetic—to rival naval powers. Though British capital had been widely invested in overseas petroleum production, only in Burma and Mexico was a British oil company predominant in the early years of this century. In Burma the entirely British-owned Burmah Oil Company controlled almost all the production; and the Admiralty concluded a standing contract for the supply of up to 100,000 tons of oil fuel a year in war-time. In Mexico, where production began in 1901, the biggest company was the British-owned Mexican Eagle Oil Company; but unfortunately Mexican fuel oil was unsuitable for naval use. On the eve of the First World War most of the Navy's current supplies were in fact coming from Roumania; and here German interests were prominent. But the greater part of the world's oil resources, outside the continental United States, were in the hands of two huge firms, neither of them thought to be reliable when Britain was at war. The larger of these, the Standard Oil Company, founded in 1870 by Mr. John D. Rockefeller, had been built up as a refining, distributing, and marketing concern. In 1886 it extended its interests into crude oil production and by the end of the century had acquired production resources outside the United States, notably in the Dutch East Indies and Roumania. Meanwhile, in 1899 the original Standard 'trust' had been reorganised under its largest constituent company, the Standard Oil Company (New Jersey). In 1911 the company was declared to be in violation of the Sherman Anti-Trust Law and its subsidiaries within the United States were forced to develop as independent concerns. The overseas subsidiaries, however, remained under control of the parent company.

The Standard Oil Company's chief rival outside America was the

Royal Dutch Petroleum Company, founded in 1890 to exploit the oil of the Dutch East Indies. Under the leadership of Mr. H. W. A. (later Sir Henri) Deterding, the Royal Dutch Petroleum Company carried through a merger, in 1907, with Shell Transport and Trading Company Ltd., a British firm which distributed and marketed oil, and operated chiefly in the Far East. The resources of the two concerns were pooled under three subsidiary holding companies (the Bataafsche Petroleum Maatschappij, the Asiatic Petroleum Company, and the Anglo-Saxon Petroleum Company) in each of which the share of the Royal Dutch Petroleum Company was 60 per cent. Like the Standard Oil Company the Royal Dutch/Shell Group also spread horizontally at the production stage, acquiring resources in Russia and Roumania.

To the British Admiralty, pre-occupied in those years by the naval race with Germany, this was an alarming state of affairs. The Standard Oil Company's expansion abroad threatened to place Britain in permanent dependence on Americans. The Admiralty also looked with mistrust on the successful advance of the Royal Dutch/Shell Group which, it was feared, might come under the domination of Germany. The best that could be hoped in war-time was that this Group would act in line with Dutch national interests; but Holland, small and vulnerable, might find it hard to resist pressure from her powerful eastern neighbour. In peace-time Britain might be able to buy all the naval oil she needed, though she would have to buy it at the foreigner's price; in a war with Germany, in which the neutrality of foreign suppliers was the very best that could be expected, the possibility could not be excluded that Britain might be unable to buy oil fuel for her Navy at any price at all.<sup>1</sup>

From the early years of the present century the British government strove hard to remedy this state of affairs. It strove in two directions. First the Government sought to ensure that any oil found in future within the British Empire should not fall into the hands of the foreign companies. Thus, in 1904, the Standard Oil Company was prevented from obtaining a footing in Burma. In that same year a joint Colonial Office and Admiralty committee drew up a set of principles on which all mining legislation in the colonies was to be modelled. These required that oil concessions granted in future in territories under British influence or control were to include the following conditions: the concessionaire company had to be British with a specified number of British directors; as far as possible the senior staff employed were to be British; the company was to undertake to establish a local refinery capable of producing oil fuel to Admiralty

<sup>1</sup> These views were expressed by the Admiralty in evidence placed before the Royal Commission on Fuel and Engines. (H.M.S.O. 1913).

specification; and the British government was to have a right of pre-emption in war-time. When, at last, oil was found in Trinidad, the concession on Trinidad Crown Lands was granted on these terms to a British company, Trinidad Leaseholds Ltd., which was formed to exploit it. This policy did not of course obtain in the self-governing Dominions; but a proposal that they should adopt such a policy was put forward at the Imperial Conference of 1910.

This policy had limited results. On the eve of the First World War the total production of crude oil throughout the Empire was still only  $1\frac{1}{2}$  million tons a year, which was less than needed for ordinary peace-time requirements. This gave all the more importance to the second prong of British oil policy—to ensure that sources of supply in countries outside the Empire should remain available to Britain in time of war. In the early years of this century attention focussed on Iran, a country which had close ties with Britain. In 1901 British government support enabled Mr. William Knox D'Arcy to obtain a licence to prospect for oil throughout the whole of the Iranian Empire excepting five northern provinces under Russian influence. When Mr. D'Arcy's funds were exhausted in 1906, the Government pressed the Burmah Oil Company to come to his assistance. Oil was discovered in 1908, and in 1909 the Burmah Oil Company formed a subsidiary operating company, the Anglo-Persian Oil Company, to exploit the Iranian fields. By 1912 a refinery had been erected.

Iran was not the only field for British oil enterprise. From 1906 representatives of Mr. D'Arcy, with the support of the British government, also began trying to get an oil concession from the Ottoman government in the vilayets of Mosul and Baghdad, which were thought to be rich in petroleum. In 1909 agreement was reached, but the 'Young Turk' *coup d'état* of that year nullified this success. The Young Turk government preferred to conclude an agreement with the American Admiral Chester, who represented a group of American financiers which, as early as the late eighteenth-nineties, had received a promise of prospecting rights in Armenia and Mesopotamia. But the agreement with Admiral Chester was never ratified because of pressure from competing interests. Among these was the German syndicate originally formed to build the Berlin to Baghdad railway. This syndicate had obtained prospecting rights in 1904 with an option to exploit the oil in conjunction with the Ottoman government (an option which it never took up). Later Royal Dutch/Shell joined the hunt and, through the good offices of a Turkish subject, Mr. Calouste Gulbenkian, obtained a claim to future consideration in any concession that was offered. In 1911 the Shell Group joined forces with the Germans to set up a company, subsequently called the Turkish Petroleum Company, to discover and exploit oil throughout Ottoman territory. However, the Ottoman

government was unwilling to rebuff either the British or the Germans and it became clear, during 1912 and 1913, that no concession would be granted until the rivals had come to terms.

Meanwhile the Admiralty, increasingly disturbed by the oil supply problem, set up a committee to consider it under the Fourth Sea Lord, Captain W. C. Pakenham. The Committee's report in 1912 suggested the need for a more thorough enquiry.<sup>1</sup> In July 1912 the Government set up a Royal Commission under Admiral of the Fleet Lord Fisher of Kilverstone, to report on the means of storage and supply for liquid fuel in peace and war.<sup>2</sup> The Commission interviewed all the leading personalities of the British oil industry and collected a vast amount of evidence. It issued three reports; in November 1912, in February 1913, and in February 1914. These reports, which remained confidential, stressed the importance of making long-term supply contracts and of drawing from a wide variety of sources.

While this enquiry was going on, the Anglo-Persian Oil Company received offers of amalgamation from the Royal Dutch/Shell Group which was anxious to expand into the Middle East. The company was tempted, since its resources were not large enough to meet the competition of the major firms. But first it asked the British government for financial support on grounds of national policy. The Government was very willing to see the Iranian oilfields developed by a company on which it could rely in time of war, but there was no precedent for giving a public subsidy to a commercial company—and the Admiralty made it clear that in return the Government would want a controlling interest. This was procured by making a capital subscription of £2 million (increased in 1919 to £5 million), with the Burmah Oil Company remaining as a minority shareholder. This unprecedented venture gave the Admiralty what it wanted: a Government-controlled company on which it felt able to rely. But it did not mean that the British government had decided to go into the oil business itself. The Government made it clear that it did not propose to interfere in day-to-day business management. In the Agreement signed with the company on the 20th May 1914, it was agreed to limit government participation on the board to two *ex officio* directors representing the Treasury and the Admiralty. These representatives were to have a power of veto; but it was not intended that they should use it except when decisions of diplomatic or military significance, or affecting the British status of the company, were under discussion.<sup>3</sup> As part of the Agreement, the company signed a contract to supply oil fuel to the Admiralty at well below the

<sup>1</sup> Admiralty Committee on the use of Oil Fuel in the Navy (H.M.S.O. 1912).

<sup>2</sup> Royal Commission on Fuel and Engines (H.M.S.O. 1913).

<sup>3</sup> Cd. 7419, Agreement with the Anglo-Persian Oil Company Ltd.



current market price; this supply was to reach half a million tons a year by 1923. In time of war the Admiralty was to have first call on the entire output.

This same year 1914, which saw the British government buy control of a company enjoying a monopoly of oil resources in most of Iran also saw that same company established as a dominating partner in a consortium formed to develop the oil resources of the neighbouring Ottoman Empire. In March 1914, two months before the Agreement with the Anglo-Persian Oil Company was signed, negotiations between the rival British and German-backed syndicates had culminated in an Agreement<sup>1</sup> signed in London by representatives of those syndicates and of the British and German governments. Under this Agreement the share capital of the Turkish Petroleum Company was doubled to bring in the Anglo-Persian Oil Company, with a 50 per cent. holding. Later, in June 1914, the Ottoman government, through a Note from the Grand Vizier to the German Ambassador, consented to 'lease' to that company petroleum resources discovered, or to be discovered, in the vilayets of Mosul and Baghdad.

(iii)

### Oil Politics 1918-39

British oil prospects in the Middle East were to have great influence on the course of events in the inter-war years. But they added little to British oil security and independence during the First World War. Iranian crude oil production in 1914 was only 270,000 tons; indeed it was still under 900,000 tons four years later. Between 1914 and 1918 Britain was forced to depend heavily on the two great oil trusts in whose goodwill she had had such little confidence. They did not let her down. The Royal Dutch/Shell Group indeed behaved exactly like a British company, and Mr. Deterding became a British subject. Nevertheless there was no change in basic British oil policy; its twin aims—the development of production within the Empire, and of resources outside it through companies well disposed to Britain—were reaffirmed in a state paper of 1916 signed by the President of the Board of Trade. These aims were also endorsed at the meeting of Empire Prime Ministers attending the Imperial War Conference of July 1918.

<sup>1</sup> See Appendix I, p. 28.

When the war conference met in mid-1918, the British government was far advanced in negotiations to bring the great Royal Dutch/Shell Group permanently under British financial control. In 1916 the Board of Trade had put forward a scheme for amalgamating the assets of the Burmah Oil Company, including its holdings in the Anglo-Persian Oil Company, with those of the Anglo-Saxon Petroleum Company in such a way as to give British votes a majority over Dutch in the new combination. The scheme was approved by a Cabinet committee but came to nothing, mainly owing to the opposition of the Admiralty, which was reluctant to allow any foreign interest to have a say in the affairs of the Anglo-Persian Oil Company. In the spring of 1918 however, the Royal Dutch/Shell Group, whose experience of the pre-war Turkish negotiations had led them to appreciate the value of British diplomatic support, itself approached the British government. The upshot was an agreement<sup>1</sup> to reorganise the Group to bring all Group companies which operated outside Dutch territory, as well as all new interests the Group might acquire, under control of the British-registered Shell Transport and Trading Company Ltd; special voting arrangements were to ensure that this company remained registered in Britain and predominantly managed from London by British subjects. In return the Group was to be given an equal share in the Mesopotamian oilfields. This agreement was initialled by the President of the Board of Trade and Mr. (later Sir Henri) Deterding and received Cabinet approval in May 1919. However the negotiations with the Royal Dutch/Shell Group to give practical effect to the 'agreement in principle' dragged out unexpectedly. The experience of the Anglo-Persian Oil Company (which failed to get concessions in the western hemisphere as a result, it was thought, of its connections with the British government), led the Group to have second thoughts. Ultimately the negotiations petered out and the scheme came to nothing. In its place, in 1922, the old idea of amalgamating the assets of the Royal Dutch/Shell Group with the Anglo-Persian Oil Company and the Burmah Oil Company was revived. Since, as part of such a deal, the British government would have relinquished its holdings in the Anglo-Persian Oil Company, this proposal would have been acceptable to Shell: at the same time it would have secured a required British voting predominance in the new combination. But once more the Admiralty refused to countenance it.

This was the last attempt to bring all the properties of the Royal Dutch/Shell Group under British financial control. It is doubtful, however, whether Britain lost very much, for in all its operations outside Dutch territories the Group continued to behave as a British

<sup>1</sup> See Appendix II, p. 28.

company, working through British-registered companies controlled through the Anglo-Saxon Petroleum Company in London. The company's expansion between the wars brought valuable holdings in Venezuela under British managerial control. By the eve of the Second World War these Venezuelan fields, which were regarded as reliable war-time sources, were producing about 11.4 million tons of oil a year.

In retrospect it seems clear that the year 1919 was the high water mark of British opportunity in the search for security in oil supplies. Apart from the agreement which promised British control of one of the only two oil companies then operating on a world-wide basis, it was a year which saw British troops in occupation of the most promising oil-bearing region of the former Ottoman Empire where the Turkish Petroleum Company, now stripped of German participation, had the strongest claim to concessionary rights. At the same time there were great opportunities for British enterprise in what was to prove an even richer region, the Arabian territories lying along the western shore of the Persian Gulf. For the rulers of these territories had long had close ties with Britain and, before and during the war, they had all undertaken not to grant concessionary rights without British consent.

The British government decided, however, that it would be neither politic nor feasible to maintain an exclusive British oil position in the Middle East. In 1919, in response to a note from Paris, they opened negotiations with the French. In April 1920, an agreement was concluded at San Remo which, *inter alia*, provided a place for French interests in the Turkish Petroleum Company.<sup>1</sup> This provoked a sharp reaction from the United States where there was considerable disquiet about American oil reserves, thought to have been significantly depleted in the service of the Allies. Once more the British responded positively. In 1922 negotiations began between the partners in the Turkish Petroleum Company and a group of seven American oil companies. These negotiations stretched out until 1927. In the meantime the Turkish Petroleum Company, whose rights had been disputed by American interests, was confirmed in its concession by the Government of Iraq; and in 1928 Iraq itself was confirmed in its possession of the oil region, the rights to which had been disputed by Turkey in 1923. At the end of 1928, the Anglo-Persian Oil Company, Shell, the French company and the American Group<sup>2</sup> drew up a final agreement giving each a 23 $\frac{3}{4}$  per cent. share in the Turkish Petroleum Company, the other 5 per cent. going to Mr.

<sup>1</sup> Cmd. 675, Memorandum of Agreement.

<sup>2</sup> By then consisting of only five companies, namely Standard Oil Company (New Jersey), Standard Oil Company of New York, Atlantic Refining Company, Gulf Oil Corporation and Pan American Petroleum and Transport Company.

Calouste Gulbenkian.<sup>1</sup> Thus the British interest ceased to have a majority shareholding.

The 1928 Turkish Petroleum Company agreement not only restricted the British position in the Iraqi oilfields, but also brought about a contraction of British opportunities elsewhere in the Middle East. For a clause in this agreement, retained at French insistence from the pre-war Turkish Petroleum Company agreements, bound its eight participating companies not to operate<sup>2</sup> within the boundaries of the former Ottoman Empire except through the Turkish Petroleum Company. The area concerned was demarcated by a red line on a map attached to the 1928 agreement. The practical effect of this 'Red Line' Agreement was that any British contribution to oil development throughout Asia Minor and the whole Arabian peninsula outside Kuwait had to be shared with French and American interests within the company.

Even so the British position remained a strong one, because the 'Red Line' Agreement provided that control of the Iraq Petroleum Company (the name was changed in 1929) should remain permanently British. In fact the company's development during the 'thirties was not commensurate with the opportunities it enjoyed. In 1928 one of its participants, the Gulf Oil Corporation, had bought concessionary rights in Bahrain—an island shajkhdom lying off the Persian Gulf shore of Arabia—from Eastern and General Syndicate Ltd., a British concern. The Iraq Petroleum Company did not wish to take over these rights, and the Gulf Oil Corporation accordingly disposed of them to the Standard Oil Company of California which was not party to the 'Red Line' Agreement. When oil was struck in Bahrain in 1932 there was a general surge of interest in the coastal region of eastern Arabia. The Iraq Petroleum Company sought a concession in the area nearest Bahrain, namely the Al Hasa region of Nejd, on which the British syndicate also once had a lien. But they were outbid by the Standard Oil Company of California. Further down the coast, however, in the shajkhdom of Qatar, the Anglo-Persian Oil Company had been showing an active interest since 1925; it secured a concession which was transferred to the Iraq Petroleum Company in 1935. Subsequently the Iraq Petroleum Company, through a subsidiary, actively sought for and obtained concessions or exploratory rights in other territories within the 'Red Line' area.

Outside the 'Red Line' area the Anglo-Persian Oil Company was, of course, free to seek concessions on its own behalf. In the early 'thirties it sought one in the shajkhdom of Kuwait, which lay to the

<sup>1</sup> See Appendix III, p. 32.

<sup>2</sup> The phrase used in the text was not to 'seek for, obtain or be interested in the production of oil'.

north of the Al Hasa region. Here, as in Bahrain, concessionary rights had already been obtained by British interests and disposed of to the Gulf Oil Corporation. However, the terms of the treaty between Britain and Kuwait gave a counterbalancing advantage to the British company. In the end the two companies decided to cooperate and, in December 1933, they set up an equally-owned subsidiary company to develop the concession, which was awarded in 1934. The subsidiary, the Kuwait Oil Company, was registered in Britain and resident in London; by an Agreement of 1935 with the British government it undertook to remain permanently so.

To sum up, by the eve of the Second World War Britain was far from enjoying that total command of Middle East oil resources which had seemed so nearly hers on the morrow of the First World War. But the strength of her position there should not be underestimated. In only two oil-bearing regions—Al Hasa and Bahrain—were the concessionary rights in the hands of a non-British company; and only in Al Hasa did the British government not enjoy preemptive rights to output in time of war. On the other hand, only in Iran and Iraq was oil production sufficient, before the Second World War, to have an effect on Britain's military preparations for defence. By the late nineteen-thirties the oilfields of Iran were producing over 10 million tons of crude oil a year, and from this could be produced—mainly at a large refinery on Abadan island—sufficient Admiralty oil fuel each year to meet one year's war needs of the British Navy (after allowing, however, for drawings on stocks). From Iraq some 4 million tons of crude oil a year was being transferred by pipeline to the eastern Mediterranean, partly for refining in France and partly for local refining. A refinery capable of handling 2 million tons a year was in the last stages of construction at Haifa in British-mandated Palestine. In addition, an output of just over 1 million tons of crude oil a year was being processed at a refinery on Bahrain island. As for Kuwait and Qatar, their production still lay in the future.

(iv)

### Oil Production in Britain

British efforts to ensure that foreign oil resources would be available in time of war was supplemented, in the years immediately after 1918, by a flurry of Government activity to promote a search for oil within Empire territory—hitherto, apparently, left to the initiative

of private enterprise. In Britain itself the Government, through an agent, S. Pearson & Son Ltd., spent £560,000 in testing sites in the Lothians and on the eastern slopes of the Pennines. In 1919 the first English petroleum well was drilled at Hardstoft, some six miles west of Mansfield. The field proved to be a very small one. Meanwhile at the 1918 Imperial War Conference the Dominion governments had been urged to promote a search for oil in their own countries, and the British government subsequently paid for geological surveys in some colonies. In 1919 the United Kingdom and Australian governments agreed to share the cost of a search for oil in Papua.

This governmental impetus eventually petered out and in 1921 the task was once more abandoned to private enterprise. In Britain the Government failed to provide, however, the conditions private enterprise needed. The oil companies were hampered by having to negotiate royalty agreements with a multitude of private landowners who were often, not surprisingly, obstructive. A bill conferring rights of entry on holders of a Government prospecting licence was drafted in 1919 but in 1922 the Government announced it had no intention of legislating to give the Crown any new rights or power in respect of petroleum. It was not until 1934 that this nettle was grasped. In that year a new Petroleum Production Act<sup>1</sup> conferred rights of entry on licensed prospectors and at the same time vested all property rights over petroleum in the Crown. The Act also renewed a provision of a 1918 Act which had prohibited drilling without Government licence; this barred the way to the indiscriminate drilling or 'wildcatting' which had done so much harm to the United States oil industry in its early days. The new Act proved effective. By the end of 1938 eighty-nine prospecting licences had been granted to four companies, two of them American.<sup>2</sup> Early in 1939 a very small oilfield was discovered at Formby in Lancashire; in June of that year a larger field was discovered near the Nottinghamshire village of Eakring.

Meanwhile, licences to prospect had been granted in many colonial territories. But results were equally meagre. Small new fields were opened up in the Punjab in India and there was some development in North Borneo. The main colonial oil-producing territory remained the island of Trinidad where crude oil output (which was in the hands of Trinidad Leaseholds Ltd., and three other British

<sup>1</sup> 24 and 25 Geo. 5 c. 36. The Bill provided for owners to be compensated for damage and loss of amenities.

<sup>2</sup> Fifty-five licences were taken out by the Anglo-Iranian Oil Company (D'Arcy Exploration Company), eighteen by the Anglo-American Oil Company, fourteen by the Gulf Exploration Company and three by Steel Brothers and Company. Exploration concentrated on the South of England, the South Pennines and Midlands, North-east Yorkshire, and Midlothian.

companies, including a subsidiary of the Shell Group) reached 2.2 million tons in 1937. The only oil strike of any size within the Empire between the two World Wars took place in the Turner Valley area of Alberta in June 1936. But this was too far from the main consuming centres to attract commercial interest. Total Empire production on the eve of the Second World War was still under 6 million tons—compared with a world output of some 280 million tons.

A factor contributing to the slow pace of oil development within the Empire may have been the exclusion of foreign companies. There were certainly occasions when these foreign concerns showed themselves readier than British ones to test unpromising areas in British territories. As explained earlier the closed door policy had been embarked on in the early years of the century for strategic reasons, and stemmed from the Admiralty's general dislike of reliance on foreigners and its fear of being held to ransom. There was also the thought that if oil resources were found in the Empire by foreign companies, such companies might hold back their development in order to keep oil prices from falling. This point of view still held the field in 1918. Indeed, regardless of the fact that Britain had just come successfully through a great war during which she had found herself in total dependence on foreign oil interests, the Imperial War Conference of that year saw the Governments of the Dominions nonetheless urged to adopt the closed door policy. During the nineteen-twenties, however, doubts began to set in about the wisdom of this policy. For one thing, it provoked reprisals. The Americans, angry at seeing their companies discriminated against, passed a Minerals Leasing Act restricting the grant of oil leases over American public lands to nationals of countries that gave similar opportunities to Americans. In 1921, when American disapproval was at its most vocal, the newly-established Petroleum Department, which had been made responsible for the execution of British oil policy, urged that the closed door should be abandoned. It expressed the same view in 1929 when the question of the Bahrain concessions was being discussed. The Cabinet gave approval in principle to the idea of ending the policy in 1930,<sup>1</sup> but for one reason or another no further step was taken until 1935. In June of that year foreign companies were given the right, under certain conditions, to obtain prospecting licences in the United Kingdom. In July 1936 the Colonial Secretary told the House of Commons that the closed door policy would end throughout the colonial Empire, with effect from September 1938.<sup>2</sup>

<sup>1</sup> In 1921 and again in 1930 the question was postponed for consideration by the Imperial Conference; on each occasion it was found unsuitable for the Conference to consider.

<sup>2</sup> H. of C. Deb., Vol. 314, Cols. 1407-1409, 9th July 1936.

(v)

## Oil from Coal

It was remarked at the beginning of this chapter that reserves of liquid petroleum are not the only source of mineral oil products. In Scotland oil was produced from shale, and on the eve of the First World War the Fisher Commission had looked into the prospects for this industry. At that time the Scottish shale firms were finding it increasingly hard to compete with imported petroleum. They therefore offered to devote themselves exclusively to producing oil fuel for the Navy in return for a perpetual supply contract.<sup>1</sup> The Admiralty was unwilling to bind itself to this extent; it did undertake, however, to purchase 30,000 tons of shale fuel oil a year. During the war years when imports were reduced by the submarine blockade, the Government acted energetically to keep the shale industry's output up to its maximum. After the war, in 1919, it induced the Anglo-Persian Oil Company to take over the shale oil companies and run the industry as an integrated unit. The Anglo-Persian Oil Company set up a subsidiary, Scottish Oils Ltd., for this purpose in 1919.

Despite the utmost that could be done in the way of rationalisation and technical improvement, the shale oil industry proved unable to compete on equal terms with the petroleum companies. This was hardly surprising since whereas petroleum could be extracted from the earth in liquid form without the need for manual labour, shale oil was extracted from solid material which itself had first to be dug from the earth by hand and machine. The Government was not prepared to go out of its way to redress the unbalance. In 1920, when the price of petroleum was still high, the Admiralty renewed the contract for 30,000 tons of oil a year. But in 1925, when petroleum prices were very much lower, the Admiralty allowed the contract to lapse although the industry was in desperate straits. The fact was that the contribution of the Scottish shale industry, dwarfed by the rising estimates of war needs, was too small to count for much strategically. What Government interest there was in its survival came from a desire to avoid unemployment among the shale workers, and this was not a strong enough motive to induce the Admiralty to go on paying the higher price for shale oil. Within the next ten years the industry contracted painfully. The number of its workers fell from ten thousand to four thousand, half of whom were working only part-time.

The manufacture of oil from coal had much greater potentialities. Coal, unlike treatable shale, was abundant in Britain and in those

<sup>1</sup> Royal Commission on Fuel and Engines (H.M.S.O. 1913).

days, indeed, supplies were thought of as almost unlimited. It would have been appropriate if the British had countered the vulnerability arising from the supersession of their traditional native fuel by converting part of this coal into oil suitable for naval and other Service use. Moreover, greater strategic security was not the only prize to be won by such an undertaking. Of the economic problems which afflicted Britain between the wars the most conspicuous and socially harmful was the chronic distress of the coal industry resulting from contraction of its markets abroad. An 'oil from coal' industry might have solved this problem.

The Government was fully alive to the technical possibilities. In 1917 the Department of Scientific and Industrial Research<sup>1</sup> set up a Fuel Research Board to enquire into feasible methods of treating and using fuels, especially coal and its derivatives. The Fuel Research Station, built at Greenwich in 1919, did a lot of research into 'oil from coal' processes; and its results were made available to industry.

In fact down to the end of the nineteen-twenties the only process which had advanced beyond the experimental stage was carbonisation, the process used in the manufacture of gas and metallurgical coke. In carbonisation coal is heated in a retort until its more volatile components are given off in the form of gas, leaving a residue of almost pure carbon, which is coke. From the gas a black and highly viscous liquid, crude tar, is extracted by condensation; and this, when distilled, yields in its turn a series of oil fractions and a solid residue called pitch. Of these 'coal tar oils', creosote oil, a medium-to-heavy distillate with a boiling range beginning at about 200° C., is produced in greatest quantity. Benzole, a light oil fraction distilling between 70° C. and 160° C., can also be distilled from the tar; larger amounts of benzole, however, remain in the gas, and may be separated from it by passing through an absorbent 'wash-oil'.

In the gas and metallurgical coke industries, the oil yield is a secondary consideration and carbonisation takes place at temperatures between 1,000° C. and 1,500° C. If the coal is carbonised at lower temperatures however, its volatile constituents are not 'squeezed out' to the same extent, gasification is reduced, and the yield of tar and, consequently, of oil, is increased. In this case the solid residue is a kind of semi-coke which, since it still contains volatile materials, is readily ignitable. During the nineteen-twenties and nineteen-thirties, several attempts were made to exploit this Low Temperature Carbonisation process commercially to produce a smokeless fuel for domestic use, the semi-coke being marketed under the name of coalite.

<sup>1</sup> The Department of Scientific and Industrial Research was set up in 1916 under the Lord President of the Council, to assist British industry keep abreast of technological process. It was assisted by a council of scientists and industrialists.

Low temperature carbonisation of coal did not offer a practicable economic alternative, however, to dependence on imported oil. In 1925 the Department of Scientific and Industrial Research estimated that to meet all Britain's oil requirements in war by this means would require an additional one million men to mine the extra coal and operate processing plants.

During the 'twenties, however, new coal treating processes were developed which, unlike carbonisation, had the production of oil from coal as their main objective. It has been said that the major difference in the chemical composition of oil and coal is that oil contains a much higher proportion of hydrogen. To produce oil from coal, then, the proportion of hydrogen to carbon must be raised. In carbonisation this is achieved by separating the coal into two parts, one of which contains a higher percentage of hydrogen to carbon than raw coal, leaving the other containing very much less. Here the output of oil is obviously limited by the amount of hydrogen originally present in the coal. If hydrogen supplied from an external source could be combined with the material in the coal this limitation would not apply.

Two processes of this kind were developed between the wars. One was the Fischer-Tropsch or synthesis process, in which the coal is broken down into its chemical constituents, carbon, hydrogen, and oxygen, which are then recombined, with the aid of steam (H<sup>2</sup>O), to form mostly liquid hydrocarbons which can be distilled to give a full range of products from petrol to paraffin wax. In the second, the Bergius hydrogenation process, externally supplied hydrogen is combined with the carbon in the coal with the aid of a catalyst. This process could also be used to convert a heavy oil fraction into a lighter one.

The development of an industry based on these 'oil from coal' processes had obvious attractions for any industrial country which had plenty of coal but little or no petroleum. During the nineteen-thirties the German government built both hydrogenation and Fischer-Tropsch plants, and by the outbreak of war a substantial part of Germany's oil requirements was being met from coal. By contrast Britain built only one hydrogenation plant in the same period. Commercially, of course, oil produced from coal (other than as a by-product of gas or coke) could not compete with petroleum any better than oil from shale and for the very same reason: it cost far too much to produce.<sup>1</sup> In 1929 and 1930 however, a Labour

<sup>1</sup> In 1937 the cost of mining, retorting and refining shale oil worked out at 6·7d. per gallon of crude shale oil. For hydrogenation the estimated cost of production was about 10d. per gallon of petrol. In 1937 the declared c.i.f. value of imported petrol was 4½d. per gallon. Petrol was the highest priced product, apart from lubricating oil. See Cmd. 5665.

government saw in hydrogenation an answer to unemployment in the coal industry. It contemplated participating directly in a company to construct and operate a plant which could become the forerunner of a great new industry. But the succeeding government, preoccupied with the financial crisis, had no such grandiose vision. Through fiscal policy, however, this government did give some encouragement to the production of oil in Britain from solid materials. The budget of 1928, reviving a useful source of revenue untapped since 1920, placed a duty of 4d. a gallon on imported petrol, and this was raised to 6d. and then to 8d. during the financial crisis of 1931. In 1938 the petrol tax was raised again to 9d. a gallon. Petrol produced at home from coal and shale was always exempt from the tax. In March 1934 the Government took a further step with the deliberate intention of encouraging the construction of 'oil from coal' plants in order to gain operating experience of the new processes. Under the British Hydrocarbon Oils Production Act 1934<sup>1</sup> it gave a statutory guarantee that the preference accorded to home-produced petrol would remain at not less than 4d. a gallon for a period of nine years beginning in April 1935. In the Finance Act of 1938<sup>2</sup> this guaranteed preference was increased to 8d. and its duration was extended to 1950.<sup>3</sup> The guaranteed preference encouraged Imperial Chemical Industries Ltd. to build a hydrogenation plant at Billingham, on the Tees, to manufacture 150,000 tons of petrol a year from coal. The plant went into production in 1935, and by 1938 was working at nearly full capacity. As it happened however, for reasons both technical and financial, creosote was used to a greater extent than coal as the raw material. As for the Fischer-Tropsch process, this had not progressed beyond the laboratory stage in Britain at the outbreak of the Second World War.

Down to the middle 'thirties the Government moved forward cautiously and very little was accomplished. In 1936, under growing threat of war, the Government decided that the time had come to make a full enquiry into the long-term implications of oil production from home resources. There had been no such enquiry since the Fisher Commission had reported in 1913 in very different circumstances. In April 1937 the Committee of Imperial Defence appointed a special sub-committee under Viscount Falmouth, a member of the Advisory Council of the Department of Scientific and Industrial Research, to 'consider and examine the various processes for the production of oil from coal and certain other materials indigenous

to this country, and to report on their economic possibilities, and on the advantages to be obtained by way of security of oil supplies in emergency'.<sup>1</sup>

The Falmouth Committee reported in November 1937.<sup>2</sup> Its examination of the shale and carbonisation industries came at a time when both were enjoying more prosperity. The preference given to home-produced petrol had made it worth while for more gas to be stripped for benzole. The preference had also helped the shale oil industry, earlier threatened with extinction; and when, in 1933, a tax of 1d. a gallon—£1 a ton—was imposed on imported heavy oils to assist the coal industry, the industry's position was eased a little more. But the biggest help came in 1935 when imported gas oil for use in diesel-engined road vehicles was subjected to the same duty as petrol; for this had become the shale industry's main product. Another favourable factor was the discovery, in the middle 'thirties, of new and richer shale seams. As a result of all those developments output began to rise; even so, on the eve of the Second World War, shale oil production was only between a third and a half of what it had been on the eve of the First World War. The Falmouth Committee dismissed both the shale and the carbonisation industries as too small to be of significance, either economically or strategically.

On the major policy question before it, the Falmouth Committee came down heavily in favour of the policy of relying on petroleum imports, and against the encouragement of a large 'oil from coal' industry in Britain through either the Bergius or Fischer-Tropsch processes. The committee was unimpressed by the strategic argument that a switch to home production would give the country a more secure source of supply in war-time. Imported supplies carried in numerous ships and discharged through various ports would be less vulnerable, the committee argued, than 'oil from coal' plants which would be conspicuous targets for air attack. As for economic considerations, the committee estimated that to seek a cure for mass-unemployment by building 'oil from coal' plants would cost as much as making a continuing allotment of £5 a week for every person so employed. Furthermore if such plants were used in peace-time they would be all the more necessary in war-time because the competitive facilities for importing petroleum would have contracted. In time of war, however, the required manpower and materials would be very scarce and the economic cost to the community of an 'oil from coal' industry would then prove unsupportable. In furtherance of these arguments the Falmouth Committee estimated that for the cost of building one hydrogenation plant to manufacture 150,000 tons of

<sup>1</sup> 24 and 25 Geo. 5 c.4.

<sup>2</sup> 1 and 2 Geo. 6 c.46.

<sup>3</sup> It was also widened to cover diesel oil used in road vehicles. The 1934 Act had provided that if the preference were greater than 4d., the duration of the guarantee would be correspondingly reduced. Since the actual preference over the years which followed had been 8d. it had been due to expire in 1939.

<sup>1</sup> Sub-Committee on Oil from Coal.

<sup>2</sup> A version from which the confidential material was omitted was published as Cmd. 5665, Sub-Committee on Oil from Coal, Report.

oil a year, enough tankers could be built to carry twelve times that amount of oil annually to Britain. The committee suggested that the hydrogenation process might still be useful, not to save imports but to supplement them. Petrol produced by this process was of higher quality than ordinary petrol and high-quality petrol for aircraft engines seemed very likely to be in short supply in time of war.

(vi)

### How Much Security?

In the early years of this century the aim of British policy had been to ensure that ample supplies of oil would be available at reasonable prices to the British Armed Forces in war-time. The British had sought to secure this objective by initially adopting a closed door policy in Britain and the British colonies, and by seeking to obtain financial and administrative control over foreign oil supplies. The first policy, far from improving the position, may well have made it worse by reducing the supply of would-be developers, and by encouraging reprisals against British companies outside the Empire. The second was pursued with sufficient success, so much so indeed that the British government preferred to rely on these foreign oil supplies rather than develop a native 'oil from coal' industry when this became technically feasible in the 'thirties. By 1939 the British government had reason to rely on war-time access to the world-wide resources of the Shell Group and in addition, through three British companies—Anglo-Iranian, Iraq Petroleum, and the Kuwait Oil Company—access as well to the greater part of the oil resources of Iran and the former Ottoman Empire. It must be observed, however, that the oil resources on which these companies had been founded were still largely undeveloped. In 1939 total Middle East oil production was only about 5 per cent. of world production, and some of the Middle East oil was bespoken for the French.

One question still begs an answer. How much security did Britain actually enjoy from the structure of understandings, legal rights and administrative controls garnered over the years? Even before the Second World War there were signs that this structure was built on shaky foundations. In November 1932, the Iranian government cancelled the D'Arcy concession, the cornerstone of the whole British position. In 1937 the Mexican government expropriated the properties of foreign oil companies, including the British-owned Mexican Eagle Oil Company (by then part of the Shell Group) which accounted for 65 per cent. of Mexican production. The Mexican dis-

pute was still unsettled at the outbreak of war, and the British government could do no more than organise a boycott of Mexican oil. The outcome of the dispute with Iran was more satisfactory to Britain. A new concession was granted to the Anglo-Iranian Oil Company in 1933. It covered a much smaller area and the basis of payments to the Iranian government was changed to improve its receipts in times of depression (for a percentage of the company's profits there was substituted a royalty on output with a specified minimum). The Shah also undertook not to cancel the new concession arbitrarily and it was to run until 1993 instead of 1961.

The truth is that it was on their access to Middle East oil, (which was then in any case inadequate to meet all requirements) that British oil independence rested. That access was itself merely a reflection of Britain's political and military presence in the Middle East. All the concessions secured there had been granted by governments which had accepted close ties with Britain. The concessions could be counted on only as long as those ties remained unbroken.

This chapter has described the historical and economic background to British oil planning for the war of 1939-45. We must now turn to the plans themselves.

## APPENDIX I

## The 1914 Agreement on the Mesopotamian Concession

*Turkish Petroleum Concessions**Arrangements for fusion of the interests in Turkish Petroleum Concessions of the D'Arcy Group and of the Turkish Petroleum Company*

It is agreed that the interests shall be divided as follows:

Fifty per cent. to the D'Arcy Group,

Twenty-five per cent. to the Deutsche Bank,

Twenty-five per cent. to the Anglo-Saxon Petroleum Company, and that, in order to carry out this division:

1. The shares in the Turkish Petroleum Company now held by the National Bank of Turkey shall be transferred in equal moieties to the Deutsche Bank and the Anglo-Saxon Company.

2. The capital of the Turkish Petroleum Company shall be increased to £160,000 by the creation of 80,000 new shares of £1 each of the same class as those now existing.

3. These 80,000 new shares shall be allotted to the D'Arcy Group on terms to be agreed upon between the parties.

4. The Board of the Company shall consist of 8 members, of whom 4 will be nominated by the D'Arcy Group, 2 by the Deutsche Bank, and 2 by the Anglo-Saxon Company.

5. The capital of the Turkish Petroleum Company shall be employed only in exploring, testing and proving oilfields, a separate public company or companies being formed to work any field or fields the examination of which has proved satisfactory.

6. Such working company or companies shall issue to the Turkish Petroleum Company fully paid ordinary shares as consideration for the acquisition of the rights of the company to the properties to be acquired; such ordinary shares shall carry full control of the working company or companies, which control shall in no circumstances be parted with by the Turkish Petroleum Company.

7. The working capital required by such working company or companies shall be raised by means of preference shares and (or) debentures which shall be offered to the public to such extent as the members of the Turkish Petroleum Company or any one of them shall elect not to subscribe for themselves.

8. The alterations in the memorandum and (or) articles of association of the Turkish Petroleum Company necessary to carry out the above conditions shall be made forthwith.

9. Mr. C. S. Gulbenkian shall be entitled to a beneficiary 5 per cent. interest without voting rights in the Turkish Petroleum Company, this 5 per cent. being contributed equally by the D'Arcy Group and the Anglo-Saxon Company out of their respective holdings. The shares representing Mr. Gulbenkian's interest shall be registered in the names of nominees of the D'Arcy Group and of the Anglo-Saxon Company, and shall be held by them, but undertakings shall be exchanged between these parties whereby—

- (1) Mr. Gulbenkian undertakes to pay the calls on the shares, and
- (2) The D'Arcy Group and the Anglo-Saxon Company undertake that Mr. Gulbenkian shall be entitled to all financial benefits of the shares.

If Mr. Gulbenkian shall desire to dispose of his interest, and also in the event of his death, the D'Arcy Group and the Anglo-Saxon Company shall have the option of purchasing the interests standing in their names on the terms defined in Article 36(b) of the articles of association of the Turkish Petroleum Company.

10. The three groups participating in the Turkish Petroleum Company shall give undertakings on their own behalf and on behalf of the companies associated with them not to be interested directly or indirectly in the production or manufacture of crude oil in the Ottoman Empire in Europe and Asia, except in that part which is under the administration of the Egyptian Government or of the Sheikh of Koweit, or in the 'transferred territories' on the Turco-Persian frontier, otherwise than through the Turkish Petroleum Company.

Foreign Office  
19th March 1914

(For the Imperial German Government)  
R. VON KÜHLMANN

(For His Britannic Majesty's Government)  
EYRE A. CROWE

(For the National Bank of Turkey)  
H. BABINGTON SMITH

(For the Anglo-Saxon Petroleum Company Limited)  
W. DETERDING  
WALTER H. SAMUEL

(For the Deutsche Bank)  
C. BERGMANN

(For the D'Arcy Group)  
C. GREENWAY  
H. S. BARNES



## APPENDIX II

## Draft Agreement between the British Government and the Royal Dutch/Shell

It is desired to secure that the Shell Transport and Trading Company Limited, and certain other companies included in the Royal Dutch/Shell Group shall be brought permanently under British control. It is not, however, desired to interfere with the commercial policy or financial or business management of the companies concerned.

It is agreed that these objects can be secured as follows:

- (a) 1. His Majesty's Government will be advised to use their best endeavours to secure, either by re-arrangement of the capital in the Turkish Petroleum Company or otherwise, that the Royal Dutch/Shell Group by the medium of the Anglo-Saxon Petroleum Company (or such other British Company owned by the Shell Group as may be deemed preferable by His Majesty's Government) and the Anglo-Persian Oil Company shall be admitted to equal participation in the exploitation of all oilfields in Asia Minor including what is usually called Mesopotamia. The interest of any other participant shall be held as may be arranged hereafter. Certain shares with a special majority voting power in the Company operating in Mesopotamia shall be controlled by His Majesty's Government and the management shall be permanently British.
2. Percentage of holdings by His Majesty's Government, the Anglo-Persian Oil Company and the Anglo-Saxon Petroleum Company.  
The combined votes of these three parties shall be put into a Voting Trust and the majority of the votes in this Voting Trust shall instruct how the 70 per cent. block shall vote.
3. The shareholdings of the Anglo-Persian and the Anglo-Saxon shall be 34 per cent. each, and His Majesty's Government 2 per cent., which would leave 30 per cent. for other interests, which interests if of less amount the balance would be divided equally between the Anglo-Persian and the Anglo-Saxon Companies. The partners in the Company so formed shall be simultaneously informed as to all arrangements. The Articles of Association shall provide that the directorate will be appointed by the interests concerned in proportion to their shareholdings.
4. Notwithstanding the necessity for the Company so formed to lay a pipeline from its fields to the Mediterranean it will not oppose or obstruct directly or indirectly the laying at any date of a similar line connecting the Anglo-Persian fields with that shore, on the understanding that the above is a Trans-Continental line to convey

oil to the Mediterranean, and not to be used directly or indirectly for distributing oil in Asia Minor.

5. The management of the Company so formed shall be entrusted by contract to the Shell Company Group for a period of seven years from the date of the Company's formation and thereafter for such term as the Board may decide.
6. The Shell Group management of the Company so formed shall be under the orders of the Board and therefore under the control of the Voting Trust. The Board shall not permit the Managers to conclude any marketing arrangement with the Anglo-Persian Company or its subsidiaries or associations without the Shell Company's consent, nor shall the Board permit the Managers to conclude any marketing arrangements with the Shell Company or its subsidiaries or associations without the consent of the Anglo-Persian Company. In any dispute under this clause the only interest which shall be considered shall be that of the Company so formed. The Company so formed shall construct and control its own pipelines, shall erect and run its own refineries and shall arrange its own marketing. The Board of the Company so formed, in deciding through which channel surplus oil for export whether crude or refined shall be dealt with, shall take as their only guidance the financial interests of the Company so formed.
- (b) The said Shell Transport and Trading Company Limited shall make arrangements with His Majesty's Government that no change in its directorate as at present constituted shall take place without the consent and approval of the Governor of the Bank of England and/or some person of similar standing nominated by His Majesty's Government.  
Further, the said Shell Transport and Trading Company and certain other companies in the group shall remain or become registered in Great Britain, shall be so constituted that 75 per cent. of the directors of the said Company and a majority of the directors of the other companies shall be British-born British subjects and shall be precluded from selling or disposing of their capital assets so as to place the same outside British control.
- (c) The Anglo-Saxon Petroleum Company Limited, which company by virtue of various contracts controls and manages the companies detailed in the schedule hereto annexed,<sup>1</sup> shall be reconstituted so that the control of all these companies shall be permanently vested in the Shell Transport and Trading Company.
- (d) As arranged any of the companies specified in the schedule hereto annexed<sup>2</sup> which are not now registered in the United Kingdom, shall be brought under British control as soon as practicable, with the exception of the company specified in paragraph 4 of the said schedule.

<sup>1</sup> Not attached.

<sup>2</sup> *Ibid.*

- (e) None of the properties, leases, concessions or ships of the companies and none of the other capital assets of the companies of a value exceeding £            shall be sold, leased, mortgaged or otherwise dealt with in any way which shall have the effect of vesting the control thereof in anyone other than the Board of Directors of the companies or other companies similarly constituted without the approval of an extraordinary resolution of the companies in general meeting and any contract or arrangement in contravention of this provision shall notwithstanding any other provision of the Articles of Association of the companies and any powers conferred upon the directors of the companies be absolutely void and of no effect.
- (f) Fresh interests in production, transport and marketing, other than interests which have holdings under French control, and interests in territories under Dutch rule, shall always be entered into or acquired by the Royal Dutch/Shell Group through the medium of the Anglo-Saxon Petroleum Company unless the British nominee as hereinafter defined consents that such interests shall be otherwise controlled.
- (g) The Articles of Association of the companies concerned shall provide or be altered by special resolution to provide for the following points:
- (1) If possible there shall be a special class of share to be called British Control Shares of small nominal amount say £            in each case. If this is impossible some other method shall be adopted giving to the British nominee mentioned below special powers as detailed in the following section.
- (2) The Governor of the Bank of England or some such nominee as may be agreed between the parties to be called the 'British nominee' shall be entitled to one vote only on all questions at general meetings other than the following, viz:
- (a) Any resolution for the alteration or cancellation of any of the special provisions herein referred to;
- (b) Any resolution for the approval of any arrangement for sale, lease, mortgage or other disposition of the capital assets of the companies as above-mentioned;
- (c) Any resolution for liquidation except where the company is actually shown to be trading at a loss;
- (d) Any resolution for the alteration of the Articles of Association, on which questions the British nominee shall exercise a number of votes exceeding by one vote the total number of votes which can be cast by the other parties entitled to attend and vote at such meetings.
- The British nominee will also be entitled at all times to veto the election of any new British director.

- (3) For any general meeting convened for any of the purposes (a), (b), (c) and (d) referred to in paragraph (g)(2) above, there shall not be a quorum present at any such meeting unless the British nominee is present or represented by proxy.
- (4) Any person whether a shareholder or not may be appointed to act as proxy for the British nominee.
- (5) At least three-fourths of the directors of the Shell Transport and Trading Company and the majority of the directors in the companies specified in the schedule hereto annexed<sup>1</sup> shall always be British-born British subjects.
- (6) The consumers of the British Empire and of France and its Colonies shall receive as regards prices, quantities and deliveries, the advantages of the most-favoured nation.
- (7) Taxation clause protecting Dutch shareholders to be provided.
- (8) This agreement is initialled by Lord Harcourt and Mr. Deterding as a recommendation by the former to His Majesty's Government and by the latter to his Dutch colleagues but is not binding on either until confirmed by each.

(Intld). H.

(Intld). H. D.

6th March 1919

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<sup>1</sup> Not attached.

## APPENDIX III

## Extracts from 'Red Line' Agreement

AN AGREEMENT made the Thirty-first day of July 1928 BETWEEN D'ARCY EXPLORATION COMPANY LIMITED a Company incorporated under the Companies Acts 1908 to 1917 whose registered office is situate at Britannic House Finsbury Circus in the City of London (hereinafter called 'the D'Arcy Company') of the first part THE ANGLO-SAXON PETROLEUM COMPANY LIMITED a Company incorporated under the Companies Act 1862 to 1900 whose registered office is situate at St. Helens Court Leadenhall Street in the City of London (hereinafter called 'the Anglo-Saxon Company') of the second part COMPAGNIE FRANÇAISE DES PÉTROLES a Société Anonyme incorporated under the laws of France whose siège social is situate at No. 63 Avenue Victor Emmanuel III Paris in the Republic of France (hereinafter called 'the French Company') of the third part NEAR EAST DEVELOPMENT CORPORATION a Company incorporated under the laws of the State of Delaware U.S.A. whose principal office is situate at 26 Broadway New York U.S.A. (hereinafter called 'the American Company') of the fourth part PARTICIPATIONS AND INVESTMENTS LIMITED a Company incorporated under the laws of the Dominion of Canada whose principal office is situate at Dominion Bank Building, King Street, Toronto (hereinafter called 'the Participations Company') of the fifth part and TURKISH PETROLEUM COMPANY LIMITED a Company incorporated under the Companies (Consolidation) Act 1908 whose registered office is situate at No. 97 Gresham Street in the City of London (hereinafter called 'the Turkish Company') of the sixth part.

WHEREAS the Turkish Company was incorporated on the 31st day of January 1911 under the Companies (Consolidation) Act 1908.

AND WHEREAS the capital of the Turkish Company is now £2,000,000 divided into 2,000,000 shares of £1 each the whole of which are issued.

AND WHEREAS immediately prior to the execution hereof the shares of the Turkish Company were held as follows:

Name of Shareholder	Serial Number of Shares held	Total Number of Shares held
The Anglo-Saxon Petroleum Co. Ltd.	{ 20,001- 56,000 601,001- 790,000 1,300,001-1,525,000 }	450,000
Calouste Sarkis Gulbenkian	{ 59,001- 60,000 595,751- 601,000 1,250,001-1,256,250 }	12,500
D'Arcy Exploration Co. Ltd.	{ 80,004- 156,000 160,001- 558,985 1,525,001-1,999,982 }	949,964

## APPENDIX III

Name of Shareholder	Serial Number of Shares held	Total Number of Shares held
Lloyds Bank City Office Nominees Ltd.	{ 56,001- 59,000 156,001- 160,000 559,001- 580,000 580,001- 595,750 1,256,151-1,281,250 1,281,251-1,300,000 }	87,500
Sir John Buck Lloyd	{ 80,002 558,991- 558,995 1,999,983-1,999,988 }	12
Compagnie Française des Pétroles	{ 1- 20,000 60,001- 80,000 790,001-1,000,000 1,000,001-1,250,000 }	500,000
Sir John Cadman	{ 80,003 558,996- 559,000 1,999,989-1,999,994 }	12
Arthur Charles Hearn	{ 80,001 558,986- 558,990 1,999,995-2,000,000 }	12
		<u>2,000,000</u>

AND WHEREAS on the 14th day of March 1925 a Convention (hereinafter called the 'Iraq Concession' which expression shall include any extension or modification thereof) was entered into between the Government of Iraq of the one part and the Turkish Company of the other part, whereby the said Government granted to the Turkish Company the exclusive right to explore prospect drill for extract and render suitable for trade petroleum naphtha natural gases and ozokerite and the right to carry away and sell the same and the derivatives thereof within the areas upon the terms and subject to the provisions and conditions in the Iraq Concession described or contained.

AND WHEREAS it has been agreed that the American Company and the Participations Company shall respectively become shareholders in the Turkish Company in manner hereafter appearing.

AND WHEREAS from time to time questions have arisen between the parties hereto or some of them in connection with or arising out of the Turkish Company or its undertaking or business or the engagements or rights of the parties in connection therewith.

AND WHEREAS with a view to settling such questions and to codifying for the future their rights and obligations the parties hereto have agreed to enter into these presents.

\* \* \* \*

## DISTRIBUTION OF CAPITAL OF THE TURKISH COMPANY

2. The share capital of the Turkish Company as at the date hereof shall be redistributed among the parties of the first five parts in the proportions following that is to say:

The D'Arcy Company (hereinafter called Group A)	23.75 per cent. of such capital
The Anglo-Saxon Company (hereinafter called Group B)	23.75 per cent. of such capital
The French Company (hereinafter called Group C)	23.75 per cent. of such capital
The American Company (hereinafter called Group D)	23.75 per cent. of such capital
The Participations Company (hereinafter called Group E)	5.00 per cent. of such capital
	<u>100.00 per cent.</u>

\* \* \* \*

BOARD OF DIRECTORS AND GENERAL MEETINGS OF  
THE TURKISH COMPANY

4. (i) Groups A, B, C and D (each herein termed a 'Major Group') shall each be entitled to appoint two Directors on the Board of the Turkish Company and Group E (herein termed 'a Minor Group') shall be entitled to appoint one Director.

\* \* \* \*

(vii) The Articles of Association of the Turkish Company shall forthwith be altered so as to provide that Resolutions at Board Meetings can only be carried if the Directors or one of the Directors appointed by at least three of the Major Groups vote in favour thereof and that no Resolution at a General Meeting of Shareholders shall be carried unless the votes attaching to the Shares then held by at least three of the Major Groups be cast in favour of it.

\* \* \* \*

## CONCESSIONS AND PRODUCTION

10. All the parties hereto agree that the Turkish Company or a nominee of the Turkish Company shall (except as hereinafter mentioned) have the sole right to seek for or obtain oil concessions within the defined area and each of the Groups hereby covenants and agrees with the Turkish Company and with the other Groups that excepting only as herein provided or authorised such Group will not nor will any of its Associated Companies either personally or through the intermediary of any person firm company or corporation seek for or obtain or be interested directly or indirectly in the production of oil within the defined area or in the purchase of any such oil otherwise than through the Turkish Company or an Operating

Company under the Turkish Company. Provided always that as regards any plot offered for competition under Article 6 of the Iraq Concession if the Groups are unanimous in determining to tender for a lease of such plot then a tender for such plot shall be made by a nominee on behalf of the said Groups and if such tender is successful the lease of such plot when acquired shall be transferred forthwith to a General Operating Company in which each Group shall be entitled to be offered its participation in accordance with clause 6 hereof and such General Operating Company shall be entitled to own and operate the said plot free from the restrictions in this sub-clause. If the Groups are not unanimous in determining to tender for a lease of any such plot then if any one or more Groups is in favour of so tendering a nominee of such Group or Groups shall be at liberty to tender for a lease of such plot and if successful in obtaining such a lease such Group or Groups shall procure such nominee forthwith to transfer the same to an Operating Company in which each Group shall be entitled to be offered its participation in accordance with clause 6 hereof.

\* \* \* \*

## ROYALTY OIL

12. (i) The parties hereto agree (but as regards the Groups only so far as their powers as shareholders of the Turkish Company and any General Operating Company or through the right to nominate Directors permit) to procure the delivery free of cost of the D'Arcy Company but subject to the provisions hereinafter contained of ten per cent. (hereinafter called royalty oil) of all crude oil produced by any General Operating Company from 24 plots in Iraq each identical with a plot of such General Operating Company such plots to be selected by the D'Arcy Company at its option either within one month after the ultimate date at which the Turkish Company itself shall make its final selection of 24 plots under Article 5 of the Iraq Concession or within one month after the order is given by the Turkish Company through a General Operating Company for the construction of a pipeline to the Mediterranean and up to either of those dates the D'Arcy Company may relinquish any plot previously selected and may select in place thereof any other plot worked or taken up by any General Operating Company. Provided that if the D'Arcy Company shall relinquish any plot previously selected and select in place thereof any other plot, the D'Arcy Company shall be debited with any royalty oil it may have received from the plot first selected against any royalty oil it would have been entitled to from the plot so substituted if it had originally selected such plot.

\* \* \* \*

## WORKING AGREEMENT

13. (i) The Turkish Company hereby agrees with each of the Groups that it will offer or procure the Operating Company producing or purchasing the same to offer all crude oil whether purchased by the Turkish Company or produced or purchased by any Operating Company which is available for sale (exclusive of the royalty oil deliverable to the D'Arcy Company under the provisions hereinbefore contained) to the Groups for purchase by them upon the terms and conditions following that is to say:

- (a) The Turkish Company shall be responsible for the division of all such oil amongst the Groups and shall in this connection supervise the relations between the Groups and conduct all correspondence and keep all accounts and for so doing shall receive the sums referred to in sub-clauses (iii)(b)(4), (iv)(b) and (v) hereof.
- (b) Such oil shall be offered to the Groups in the basic proportions as existing when the offer is made but oil from any Special Operating Company shall be offered to those Groups which have contributed to the subscribed ordinary share capital of such Special Operating Company in the proportion in which such Groups are interested in such Special Operating Company.

\* \* \* \*

(iii) The price at which the crude oil produced by each General Operating Company and available for division among all the Groups shall be offered under sub-clause (i) of this clause in the first instance to the Groups shall be determined half-yearly in the following manner:

- (a) For the first two quarters in each calendar year the cost f.o.b. seaboard terminal for the first half of the previous year shall be the basis and for the last two quarters of each calendar year the cost f.o.b. seaboard terminal for the second half of the previous year shall be the basis. Provided that until the above scale can be applied the basis shall be a figure to be estimated by the Board of the Turkish Company and calculated as nearly as possible to be the cost f.o.b. seaboard terminal for the quarter in question. The price shall in each case be calculated for each General Operating Company separately.
- (b) The cost f.o.b. at the seaboard terminal referred to in paragraph (a) above shall include:
  - (1) The cost of production to each General Operating Company of the oil at the gathering station on the field including royalties and the cost of production of royalty oil (where applicable) and overhead expenses.

- (2) The cost of services rendered by General Operating Companies such as transport by the main pipelines—storage facilities at the gathering stations and at the terminal—anchorage for steamers—pumpage and port works—dehydrating plant—common refinery and similar facilities which for the purpose of this Agreement it may be agreed to provide for ends common to the Turkish Company and all the Groups such cost to be determined in the manner set out below.
- (3) Charges for services if any rendered by Special Operating Companies or third parties.
- (4) An additional sum to be fixed by the Board of the Turkish Company not exceeding 5/-s per ton.

In determining for the purposes of this clause the cost of production at a gathering station and the cost of the services above-mentioned allowance shall be made for reasonable depreciation and repayment of capital having regard to the probable life of the fields, plant and other installations together with interest at £6 per centum per annum on the amount shown in the capital account year by year.

The accounts of the Turkish Company and its General Operating Companies shall be audited annually by the same Auditors who shall be Chartered Accountants and who in addition to the usual audit shall determine and certify the cost f.o.b. at the seaboard terminal as above-mentioned and their certificate shall be final.

\* \* \* \*

## FORCE MAJEURE

- 20. (i) If any party hereto by reason of any cause whatsoever beyond the control of such party commits any breach of this Agreement such party and any party or parties hereto liable jointly with such party shall to the extent to which breach is due to such cause be relieved from liability therefor.
- (ii) No cause shall be deemed beyond the control of any party if it was within the control of such party's Associated Companies or in the case of the Turkish Company of the Turkish Company's General Operating Companies.

\* \* \* \*

## CHAPTER II

### PLANNERS AND PLANS

(i)

#### The Planning Machinery

SYSTEMATIC defence planning in Britain began in 1904 with the setting up of the Committee of Imperial Defence. This was an investigating and advisory body including both Service and civilian ministers, and presided over by the Prime Minister.<sup>1</sup> During and after the First World War the Committee of Imperial Defence gradually extended the range of its activities through a host of standing sub-committees. Among these sub-committees was the Oil Fuel Board (soon contracted to Oil Board) which was set up in March 1925 on the advice of the Principal Supply Officers of the three Services.

The Oil Board's task in the event of war was to keep the question of oil and tanker requirements under constant review. The Board was composed of representatives of three Service Departments, the Colonial and Dominions Offices,<sup>2</sup> the Mines and Mercantile Marine Departments of the Board of Trade, the Department of Scientific and Industrial Research, and the Treasury. The special and traditional interest of the Admiralty was acknowledged by placing the Board under the chairmanship of the Admiralty's Civil Lord. To add to the Board's prestige, it was also given a president of Cabinet rank, but his job was merely to preside over meetings. Once a year down to 1939 the Oil Board reported to the Committee of Imperial Defence on political, economic and technological developments in the oil

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<sup>1</sup> W. K. Hancock and M. M. Gowing, *British War Economy*, (H.M.S.O. 1949), pp.

30-35.

<sup>2</sup> The Colonial Office from the second meeting of the Board, the Dominions Office from 1929. The first President of the Oil Board was Viscount Peel, First Commissioner of Works, and later Secretary of State for India. He was followed by Lord Thomson, Lord Amulree, and the Marquess of Londonderry, all Secretaries of State for Air. In 1936 Mr. W. Ormsby-Gore, First Commissioner of Works and later Secretary of State for the Colonies, became President, to be followed in 1937 by Earl De La Warr, Lord Privy Seal, Viscount Runciman, Lord President of the Council, and finally by Mr. W. S. Morrison, Chancellor of the Duchy of Lancaster, who was President of the Oil Board at the outbreak of war.

industry. It also considered the problem of oil supplies in war-time under various strategic hypotheses put to it by the Committee of Imperial Defence. From 1928 its annual reports were circulated to the governments of the Dominions; and these governments sent in reports on their own war plans from time to time.

The Oil Board was served by two government departments. For most information the Board looked to the Petroleum Department, a branch of the Board of Trade. The origins of the Petroleum Department went back to the First World War, when the Government had set up a special Petroleum Executive to co-ordinate rival claims on oil supplies and tanker space and to give advice on petroleum questions. This Executive had remained in being after the end of the war when its specialised knowledge was of value in the complicated oil negotiations with the French, Americans and others which were described in the previous chapter. At the beginning of 1920, the Petroleum Executive was reconstituted, renamed the Petroleum Department, and placed under the Secretary for Overseas Trade. In October 1922 it lost its separate status, however, and was absorbed into the Board of Trade. Later in 1928, it was downgraded still further to become a branch of the Mines Department of the Board of Trade. The other department to serve the Oil Board was the Sea Transport Department which supplied information about tankers. This was a body with much older traditions and, until 1921, had been part of the Admiralty. Transferred later to the Board of Trade the Sea Transport Department<sup>1</sup> became a branch of the Mercantile Marine Department. The primary function of the Sea Transport Department was to provide for the shipping needs of the Armed Forces. In filling this role it had become involved in the task of oil shipment and this led it to take over general responsibility for the supply of tankers.

During the first ten years of its existence the Oil Board conducted its business at a rather leisurely pace. It took four years to draw up a supply plan for a war against Japan, and met only three times between 1926 and 1930. As for the Petroleum Department, this dwindled in strength; by 1934 there were only three officials working full-time on petroleum questions, and three others giving them part of their attention.

The tempo of activity quickened in the 'thirties as the character of Nazi Germany became apparent. In 1932 the 'ten year rule'<sup>2</sup> was

<sup>1</sup> The Department was still responsible to the Admiralty for that part of its work touching on naval needs. It was said to have had its origin in the Department of the Commissioners for Transportation appointed by Oliver Cromwell to arrange for the shipment of soldiers to Northern Ireland to put down the rebellion of Ormond and O'Neill in 1649.

<sup>2</sup> The Cabinet dictum, laid down in 1919, that war was not to be expected and prepared for for ten years. W. K. Hancock and M. M. Gowing, *op. cit.*, p. 45.

abandoned; and in November 1934 the Oil Board was asked to prepare supply plans for a war against a European enemy, with a target date of 1st January 1940. In March 1935 the Oil Board set up a sub-committee called the Tanker Tonnage Committee to consider the supply of tankers for Service needs in war-time. Meanwhile it was itself collecting estimates of departmental war requirements for oil. In February 1936, the Oil Board set up another subsidiary body, the Petroleum Products Reserves Sub-Committee, to consider the question of war stocks and how to provide and protect them. This last committee gradually took over all oil supply planning. Most of the executive work fell, of course, on the Petroleum Department, and, during 1936, that department began to take on extra staff.<sup>1</sup>

The rush to be ready had begun.

(ii)

### War Administration

If the First World War had made anything clear, it was that military endeavour needed to be supported by tight direction of the economy. It was therefore intended to bring the whole process of oil supply, shipment and distribution under governmental control. For easier understanding of this wide field of preparations it will be convenient to abandon chronology in favour of a more analytical approach. In the rest of this chapter, each aspect of planning will be described in turn: first, the machinery for administrative control and then the plans to restrict civilian consumption; supply and shipping programmes; preparations to protect oil stocks and oil ports against air attack; plans to adapt and improve port and transport facilities to cope with traffic under war conditions; and, last of all, the arrangements to co-ordinate British supply plans with those of the French.

From its inception, the Oil Board was always intended to play a part not only in the work of pre-war preparation, but also in that of war-time administration. The Board's initial terms of reference stated that, after the outbreak of war it should, 'with such additions as it may itself decide', be 'constituted as an Oil Fuel Control Board for the control and rationing of all oil supplies. . . .' In addition it was instructed to undertake a task that had proved so crucial in the First World War—namely the adjustment of priorities between conflicting demands on available resources. This was a heavy administrative load for an inter-departmental committee, even though it could be

<sup>1</sup> Even so in 1938 the Department was only thirteen strong.

assumed that in war, as in time of peace, it would enjoy the support of the Petroleum Department (which in those days was little more than a secretariat to the Board). However, in the late nineteen-thirties it was decided to define the war-time roles of these two oil bodies more precisely. Accordingly, the Petroleum Department, in January 1939, was named as the 'executive department for the general control of the supply, rationing and distribution of petroleum products' in time of war. The Board, for its part, was simply to 'review from time to time as necessary the action being taken by Departments to conserve and maintain adequate supplies. . . .' However, it was to keep, as an additional task, its other main duty 'to decide, subject to the right of appeal by any Department to the Cabinet, priority claims. . . .' This, it may be noted, left the Oil Board free to play a part of great significance in time of war. For it would provide a high-level forum for confrontation between the respective claims on oil resources submitted by the Admiralty, the War Office and the Air Ministry, and between Service needs on the one hand and those of the national economy (as presented through the Petroleum Department) on the other. Thus it would be possible for decisions on oil to reflect a balanced view of the requirements of the war effort as a whole, with due weight being given to the claims of the civilian consumer.

It was foreseen that the organisation of oil shipments would be crucial. Lack of shipping space had been the reason for the shortage of oil during the First World War. The provision of tankers and the use they were put to would also fall within the purview of the Oil Board. But in determining priorities in this field the Board was to be advised by the Tanker Tonnage Committee which, in war-time, was to act as a 'general controlling body to deal with all demands for tanker tonnage'. The executive work of tanker control was to be carried out by the Sea Transport Department, which it was intended to incorporate in a war-time Ministry of Shipping.

The Government also decided in the summer of 1938 to set up a committee to control deliveries of oil to ships in time of war. The object of this was twofold: to bring pressure to bear on foreign shipowners, who would be denied supplies from British-controlled bunker stations if they used their vessels in a way harmful to the British cause; and to ensure that the pattern of bunker offtake from British oil bunker stations throughout the world laid the minimum burden on tanker services. Here again the authorities were drawing on the experience of the First World War when an inter-departmental 'Unofficial Coal Committee' had controlled the supply of coal bunkers (and, from February 1916, oil bunkers as well) from all British bunker depots. In 1924 a Bunker Control Committee had been set up by the Advisory Committee on Trading and Blockade (another sub-committee of the Committee of Imperial Defence) to

keep changes in the pattern and character of ship bunkering under review. In its war-time executive capacity the Bunker Control Committee was to be assisted by an Advisory Committee whose task would be to keep in touch with the state of supplies and requirements at all bunker stations. The work of day-to-day control was to be carried out by the Ministry of Shipping as part of its general responsibility for the provisioning of ships. This piece of war machinery came into being in November 1938 when the Bunker Control Committee, attended by representatives of the Petroleum Department, the Admiralty and the overseas Departments, as well as Ministry of Shipping representatives, held its first meeting in its new guise. By the outbreak of war it had defined the main outlines of policy, and Customs regulations covering the issue of bunkers in war-time had been drawn up.

Such, in brief, was the administrative machine through which the Government proposed to control the war-time activities of the oil (and tanker) companies. These in turn were invited by the Government in the summer of 1938 to draw up their own administrative plans for war. The intention was to create a central body through which the policy laid down by the Government could be swiftly transmitted through the industry; and at the same time to cut out the waste in manpower and resources which would result from the separate operation of competing firms in war-time.

The shape of the petroleum industry in Britain was such that unification and centralisation was comparatively easy to achieve. In 1938 about 85 per cent. of oil refining and marketing was carried out by three large integrated companies—Shell, Standard Oil Company (New Jersey) and the Anglo-Iranian Oil Company (now the British Petroleum Company). Of these Shell, which had 40 per cent. of the market and the Anglo-Iranian Oil Company, which had more than 15 per cent., had been marketing their products together ever since 1931 through a jointly owned marketing subsidiary company, Shell-Mex and B.P. Ltd. Standard Oil Company (New Jersey) with about 30 per cent. of the trade, marketed its products in Britain through a wholly-owned subsidiary, the Anglo-American Oil Company (now Esso Petroleum Company), founded as long ago as 1888. In addition to their marketing dominance in Britain, the three concerns also owned a majority of the tankers then sailing under the British flag and the flags of Empire countries.<sup>1</sup>

<sup>1</sup> Royal Dutch/Shell owned 242 tankers of some 1.2 million gross tons (61 per cent. under British flag and 35 per cent. under Dutch flag, the balance—mostly coasting vessels—under flags of various nations). The Anglo-Iranian Oil Company owned ninety-four British tankers of 650,000 gross tons; and the Standard Oil Company (New Jersey) owned eighty-three British-flag tankers (though many were registered outside the United Kingdom) as part of a total fleet of 206 tankers, sailing mainly under the United States and Panamanian flags.



These members of the 'combine'—as they were called—could themselves form the core of a central authority against which it would have been difficult for the smaller firms to stand out. At the time of the Munich crisis, in September 1938, they joined with Trinidad Leaseholds Ltd., which had been expanding its sales in Britain since the early nineteen-thirties, and the National Benzole Company (a co-operative undertaking of British benzole producers set up in 1922 to market refined benzole, mainly for motor fuel)<sup>1</sup> to draw up the heads of an agreement for setting up a combined distributing agency, to be known as the Petroleum Board. All the paraphernalia of competition, such as separate brands and trade names, were to be done away with for the war period and the number of different grades of products was to be cut to a minimum. Stocks and facilities—such as railway rolling stock, storage tanks etc.—owned by the members were to be pooled under the Board. Each constituent company was to participate in the Board's trade in the various products proportionately to its share of that trade in the last full year of peace. Prices to the consumer were subject to approval by the Government.

This scheme received prompt endorsement and the Government proceeded to nominate a Chairman for the Petroleum Board. The choice of the big companies was Sir Andrew Agnew, of the Royal Dutch/Shell Group, who had recently retired from an active part in management. Sir Andrew worked actively in the months which followed to fill in the details of these plans. The final version of the agreement setting up the Board was signed in March 1939.

Primarily for reasons of security the multitude of smaller firms operating in Britain were not consulted in these early stages. It was intended to bring them in after war had actually broken out. But separate pre-war arrangements were made to organise the firms supplying lubricating oils. These firms were of two kinds. There were the importers who blended and marketed their own 'base stocks' on a nation-wide scale; and there were blending firms who bought 'base stocks' from the importers to blend and market oils finished to their own specification. The importers, mainly subsidiaries of major oil companies, were predominant in the growing market for motor oils. Only one United Kingdom blending firm, C. C. Wakefield and Company Ltd., which marketed motor oils under its brand name 'Castrol', had a big footing here. The other blending firms, mostly small and dating from a time when lubricants were made from vegetable oils, supplied the smaller industrial users with whom they had ancient trading connections and for whose particular needs they

<sup>1</sup> It was a condition of not imposing the petrol duty on benzole (most of which was sold in a fifty-fifty blend with imported petrol under the name of National Benzole Mixture) that it should not be marketed through the oil companies.

were able to cater. A feature of this lubricating oil section of the oil trade was that most of the firms, including some big importing firms,<sup>1</sup> dealt only in this one petroleum product. Because of this it was decided to organise a separate pooling scheme for them. In August 1939 the principal importers signed their own agreement to amalgamate their stocks and resources and to operate jointly together in a war-time Lubricating Oil Pool.

(iii)

### The Control of Demand

So much for the administrative machine; the crux of the supply task it faced was to meet the large war demands of the Services. The size of those demands would obviously vary with the scope and nature of the war being fought. From 1935 onwards planning took account of three distinct possibilities; a war against the Germans which would be confined to Europe; a war in the Far East against the Japanese; and a war waged against both countries simultaneously.

In each of these contingencies Royal Navy demands would be heavy. The Navy would have to undertake patrol and convoy work to hold open the vital sea supply routes to Britain. And in a war against Japan the main fleet would move east to take on the formidable Japanese Navy. The Army and Royal Air Force were both expected to play a bigger role in a war against Germany than in one against Japan. In a Japanese war their main task would be to garrison overseas bases and territories. In a European war the Royal Air Force would have to defend Britain from air attack and act as a strike force against enemy territory. It was anticipated that the Army, as well as garrisoning Britain, would send an expeditionary force to the Continent, although nothing like the vast military host that had been raised during the First World War was contemplated at this time.<sup>2</sup>

In the thirteenth of its annual reports dated January 1939 the Oil Board set the needs of the British Armed Forces, in the first year of a war against both Germany and Japan, at about 10¼ million tons. This figure was within approximately half a million tons of total United Kingdom consumption in 1938. The Navy intended to meet

<sup>1</sup> For instance the Vacuum Oil Company, a big American lubricating oil concern with a long-standing footing in the British market, which had merged in 1931 with the Standard Oil Company of New York to form Socony-Vacuum Corporation (later Socony-Vacuum Oil Company Inc.).

<sup>2</sup> Cmd. 5107, Statement relating to Defence.

a considerable part of its own first year needs from its stocks. Even so it was clear that the war needs of the Forces would make a big extra call on British tanker resources. Roughly 4.7 million tons of naval fuel<sup>1</sup> and about 1.75 million tons of other oil products would have to be shipped by ocean tanker, in addition to civilian supplies. Most of this was needed in Britain, the country which, of all Empire territories, was furthest away from main oil sources.

To reduce this shipping burden the Petroleum Department intended to enforce cuts in civilian consumption. Not all civilian demand could be restricted. Many key industries, such as food production and shipping, would expand their operations in war-time, and this meant they would need more fuel, including oil. The agricultural industry, for instance, was now increasingly using paraffin both for heating incubators and as an engine fuel for the tractors which were gradually displacing the horse in farm work; in 1937 agricultural users accounted for about 31 per cent. of United Kingdom consumption. Most of this was 'vaporising oil',<sup>2</sup> the name used in Britain for engine paraffin to distinguish it from ordinary household paraffin or 'burning oil'. The Petroleum Department planned to cut paraffin supplies by a quarter in war-time, but it did not intend to touch the farmers' requirements. On the contrary it expected a 'rapid and substantial' increase in vaporising oil consumption after the outbreak of war when more land would be brought under food cultivation. The whole saving in paraffin was to be made at the expense of the household consumer.

Other important war-time oil users would be the ships, British and foreign alike, bringing supplies to this country. In the First World War these ships had burned coal. But the flood of cheap fuel oil which came on the market during the 'twenties as a by-product of petrol production had encouraged shipowners to follow the example of the navies in going over to the more convenient fuel. By 1937 half the world's merchant tonnage was oil-fuelled, with 45 per cent. of these oil ships powered by marine diesel engines<sup>3</sup>—which were more economical than oil-fired steam engines. However, among British merchant lines there were many oil-fired steamers, roughly half of

which were equipped to burn coal as an alternative. The intention was to make these dual-fired ships use coal in war-time, and to encourage vessels which could only use oil to bunker at overseas ports as much as possible.

Among key war users of heavy oils on land were the steel and other metal industries: along with the glass and pottery manufacturers, they found it easier when using liquid fuel to maintain the constant furnace temperature needed in smelting and enamelling, and at certain stages of steel manufacture. This had led them increasingly to abandon coal, despite the tax placed on imported fuel oil in the 'thirties. They could not be expected to forego the advantages of oil in war-time nor could their fuel needs then be reduced. The Petroleum Department intended, however, to make them use native tar fuel in place of the imported product. Other notable fuel oil users, such as food factories, bakeries and laundries, burned oil instead of coal because it was cleaner; and these concerns could be forced to accept cuts, as well as to use substitutes, along with the owners of oil central heating plants.

But the biggest scope for saving lay in the huge and fast-growing market for motor fuel—which in the late 'thirties was coming to include an increasing quantity of 'derv oil', the gas oil developed as an engine fuel for diesel-engined road vehicles.<sup>1</sup> Not only was motor fuel the main item of civilian demand but it was also the one which contained the biggest element of dispensable consumption—namely, consumption for private motoring. The Petroleum Department intended to take drastic action here, cutting supplies by no less than two-thirds. Commercial users (lorries, vans, buses and coaches) were to be treated far less rigorously, for clearly the road haulage industry would have a necessary role to play in war-time. But against this it was hoped that the railways could take over from the roads part of the long-distance haulage work. Local deliveries by retailers' vans, together with pleasure coach services and some bus services were an obvious field for a war-time squeeze. On balance it was thought that the commercial side of the motor fuel market could make a saving of 25 per cent.

Table 1 overleaf shows civilian oil consumption in Britain in 1938 compared with projected consumption in 1940, the year assumed to be the first year of war; it also shows the saving it was hoped to make in a war against Germany, or against Germany and Japan. For a war against Japan alone the Oil Board did not think restriction would be feasible or necessary. By the same token it discounted any civilian savings in Australia and New Zealand in calculating tanker needs

<sup>1</sup> Including half a million tons from overseas stocks.

<sup>2</sup> Vaporising oil differs from burning oil in containing aromatic hydrocarbons which give it 'anti-knock' characteristics (see p. 54). Aromatics give off smoke when burning so that household paraffin contains a minimum aromatic content.

<sup>3</sup> In the diesel engine the fuel instead of being vaporised and ignited by a spark, is injected into the cylinder in the form of a spray and is ignited by the temperature of the air which has been raised through compression by the piston. Since there is no vaporisation an oil of low volatility can be used, though one rather less viscous than heavy residual fuel oil. Therefore marine diesel oil usually contains the gas oil fraction mixed with fuel oil. The advantages of using oil as a ship fuel, and of the diesel engine, can be appreciated from the fact that it took 100 tons of coal to propel a vessel of a given weight the same distance as 70 tons of fuel oil. If a diesel engine were used only 30 tons of oil was required.

<sup>1</sup> Dearer to buy but cheaper to run than the petrol engine, the road diesel engine was mainly used for 'heavy duty' vehicles, such as buses.

for a war in Europe alone, although both countries had informed the Board of tentative plans to economise in petrol.

TABLE I  
*Pre-war Estimates of War Consumption*

	Millions of tons					
	Total	Motor Spirit	Paraffin	Black Oils		Lubricating Oils
				Inland	Bunkers	
1938	9.6	4.9	0.7	2.0	1.4	0.6
1940 (unrestricted)	11.2	5.4	0.8	2.6	1.8	0.6
1940 (restricted)	8.0	3.6	0.6	1.7	1.5	0.6

The table above shows a prospective saving of some 3.2 million tons, or roughly 28 per cent., calculated from the estimated level of United Kingdom petroleum imports in 1940 if peace continued. This saving was equivalent to roughly three-fifths of the extra imports needed to satisfy Service demands if 1940 were the first year of a major war. In other words only two-fifths of those extra war needs would have to be met by the use of extra shipping capacity.

The Petroleum Department saw no administrative difficulty about restricting civilian supplies to this extent. Through its control over the operations of the oil industry the Petroleum Department could regulate as it chose the amounts made available to civil consumers. But it had to consider another point: the economic and social consequences of shortage. There could be no place in a war economy for any competitive scramble for supplies in which victory went to those who showed the greatest skill in getting what they wanted. Commodities in short supply had to be distributed in a way which was consistent with the national interest and the general sense of equity. Reviewing its plans for the various oil products, the Petroleum Department had to decide in each case whether it should go beyond mere restriction of supplies to the further stage of controlling their distribution between consumers through rationing schemes.

In some cases the answer was clearly no. There is no need for rationing where the operations of the consumer can be directly controlled—as in the voyage licensing system which was intended to regulate the movement of British merchant ships in war-time. Nor is rationing needed when the system of distribution is so simple that all transactions can be readily supervised. For these reasons the Petroleum Department did not draw up plans for rationing fuel oil. On the inland market this was sold by the oil companies direct to a

relatively few large consumers which made it possible to regulate deliveries on an individual basis, according to circumstances. Bunker oil would only be delivered through the bunker control machinery to ships which were already working within the framework of official control.

There was a far stronger case, however, for rationing domestic paraffin or 'burning oil'. Here was a complex distribution system operating through a large number of outlets—small retailers, hardware shops and itinerant traders. Here also supplies were to be reduced at a time when war conditions were likely to increase demand. The evacuation of people to the countryside was expected to create new regular consumers. There was the chance that gas and electricity supplies might be disrupted by air raids. Also to be taken into account was a Mines Department scheme to keep war-time consumption of household coal, gas and electricity down to 75 per cent. of normal.<sup>1</sup> In any case there was a precedent for paraffin rationing. A scheme had been worked out in October 1918, although the First World War ended before it could be introduced.

Despite all this the Petroleum Department decided against rationing household paraffin. The fact was that changed circumstances made it a much more difficult problem in 1940 than it was twenty-two years earlier. In the First World War most households had used regular and relatively large weekly amounts; the 1918 scheme had allowed each consumer who registered with a dealer to buy two gallons a week, with supplementary supplies granted at discretion. By the late nineteen-thirties there were fewer consumers who wanted as much as this on a regular basis. Instead there were many more occasional purchasers buying paraffin in quarts or even pints. There was also greater variety in the circumstances of each consumer. Thus any fixed entitlement would have had to be very much less than two gallons and most regular users would have needed to apply for extra supplies, involving the authorities in more clerical work than the Department thought worth while. Behind this reasoning also lay the thought that people would not be so likely to buy more household paraffin than they required for immediate needs than in the case of more glamorous commodities, like petrol. Finally, there was a practical difficulty. Keeping records and handling coupons would be a burden on village stores, many of which would be coping with food rationing arrangements as well; it would have been an impossible burden for the often barely literate hawkers who were an important part of the retail distribution system.

<sup>1</sup> See W. H. B. Court, *Coal*, (H.M.S.O. 1951), p. 155. Dealers and their customers were to be registered and records kept.

While paraffin was spared, there was never any doubt but that motor fuel would have to be rationed. Conceivably, commercial consumption could have been controlled without a rationing scheme; for right down to the end of 1938 the Ministry of Transport had been considering a war-time road transport organisation which could take direct control over the movement of goods-carrying vehicles, while bus and coach services were to be tightly restricted. But private motoring was a different matter. Here were millions of consumers using their vehicles as much or as little as they chose. For some, private motor transport was only an amenity. For others it was essential to their livelihood. In this last category were some whose activities were necessary to the community, and others whose business the community could, in a pinch, dispense with. Here were all the ingredients for a competitive 'free-for-all' in which supplies would be distributed regardless of true need or the interest of the nation.

The simplest arrangement, from an administrative point of view, would have been to deny petrol to anyone who could not show that it was in the national interest for him to have it. The Petroleum Department was not so ruthless: it accepted that motoring had come to play a part in the life of the people and that it would be seriously missed if abruptly withdrawn. Therefore the draft rationing scheme the Department submitted to the Oil Board in July 1938 made provision for all motorists to receive a supply of petrol. The essential feature of this scheme was individual appraisal of each application, with allowances tailored to the particular needs and circumstances of the applicant. The work was to be done by twelve Divisional Petroleum Offices, one in each of the twelve Civil Defence Regions into which Britain was to be divided in time of war. To guide these Divisional Petroleum Officers in their task of assessment, private motorists were divided into three classes: essential, such as doctors who used their cars for purposes vital to the community; semi-essential motorists, for instance commercial travellers, whose activities were not vital but whose business depended on car travel; and non-essential motorists for whom car travel was just an amenity. For each class the Department laid down a 'maximum allocation' within which the Divisional Officer could authorise allowances at his discretion. The idea of a maximum for essential users might seem self-contradictory but was in fact introduced to check excessive or wasteful use. It should be noted that the scheme did not discriminate against vehicles with a high petrol consumption, the allowance being related to mileage and varying with the rated horsepower of the vehicle.

This threefold classification of the motoring public did not pass unchallenged. The Chairman of the Oil Board was sharply critical

of the special provision for semi-essential users. Nevertheless it was retained and by the time of the Munich crisis the scheme was ready to go into operation except on one point regarding coupons. It was obvious that the distribution of petrol to commercial vehicles would have to take place under coupon control, if only because of the difficulty of handling rationed and unrationed supplies side by side through the same distributive system. But in September 1938 the Ministry of Transport and the Petroleum Department still had to decide which of them was to control the issue of these commercial coupons. The officials of the Ministry's intended War Transport Organisation would obviously be better placed to know who required to have the fuel. On the other hand it seemed likely that in the early months of war there would be many lorries still outside Government control. The Petroleum Department wanted these to be dealt with by its own Divisional Officers.

The experience of the Munich crisis however, caused the Ministry of Transport to revise its whole conception of the way in which it would exercise control over road haulage. The Ministry decided that it was not practicable to take over the operation of road transport directly and to regulate in detail the movement of individual vehicles. Instead the Ministry would content itself with a negative control, using the granting or withholding of fuel supplies as the instrument of coercion; in other words, control would follow from fuel restrictions instead of fuel economy being a by-product of control. This settled the question of commercial coupon distribution. Clearly it would have to be done through the Ministry of Transport's organisation. The two Departments accordingly worked out a scheme under which all 'goods vehicles' would automatically receive an allocation of coupons for petrol or derv fuel (which was included in the rationing scheme) and would apply for any more they needed to the officers of the transport control. This arrangement was approved by the Oil Board at the end of February 1939.

Later, in the spring of 1939, the Petroleum Department also had second thoughts about rationing. Its original rationing scheme had been too ambitious. A completely discretionary issue of petrol to all car users would overwhelm the Divisional Petroleum Offices with a flood of applications at the outset of the war. The result would be either a long delay while essential users got no petrol—which was unthinkable—or a delay before general consumption could be restricted. To avoid this, the Department decided that everyone who applied for petrol and could produce a vehicle registration book should automatically receive a fixed allocation equal to the maximum which the non-essential users would have been able to claim under the previous plan. The motorist could use this basic allowance as he pleased and his coupons could now be issued as a routine

matter at main post offices and local tax offices. The Divisional Petroleum Offices were left free to deal with applicants for supplementary allowances to meet specified essential or semi-essential purposes. It should be stressed that this automatic basic ration for private motorists was regarded as a purely temporary expedient to meet the difficulties of transition. Once these difficulties had been surmounted, it was intended to withdraw the basic allowance from all car owners who could not convince the Divisional Petroleum Officers that they had a claim to the use of petrol.

(iv)

### Supply and Shipment

Despite plans to restrict civilian consumption war conditions would impose large extra calls on the oil resources and tankers available to Britain. Could enough of each oil product be secured to meet the total 1940 war demands of the Empire, after allowing for restrictions in Britain? And would Britain have enough tankers at her command to ship these supplies under war conditions? The Oil Board posed these questions in 1936.

The answer to the first question was a qualified yes. Although no reliance could be placed on supplies from the Soviet Union and Roumania (nor, following the 1938 expropriation, on supplies from Mexico) it looked as if there would be ample supplies for all war needs provided some of the required oil could be obtained from the United States. The Iranian oilfields alone, it was reckoned, should be able to meet about a third of the total war requirement.

Unfortunately, at the time when supply planning began, there was a doubt about American oil. In August 1935, under the shock of the Abyssinian crisis, the United States Congress had passed a Neutrality Act prohibiting the export of munitions or implements of war to any country engaged in hostilities; and later moves in Congress suggested that oil might be included within this ban. The Oil Board therefore deemed it prudent to assume that American oil would be denied to all Empire countries, except Canada, in a war against Germany—unless Japan were involved on Germany's side. As it happened Congress passed a second Neutrality Act in May 1937 which made it clear that American oil would be available provided that Britain could pay for it in dollars and take it away in non-American ships. Nevertheless, as a precaution, planning continued on the assumption that American oil might still be denied to Britain, even though there is no evidence that the 'cash and carry' conditions

gave the oil authorities any anxiety at that time. It was evidence of the strengthening of Britain's oil position since the eve of the First World War that it was possible to contemplate a war against Germany without recourse to American oil supplies.

In fact, even on this unlikely basis, the only products likely to be short were engine lubricating oil<sup>1</sup> and 'aviation spirit', that is the high-quality petrol used in aircraft engines. So far as engine lubricants were concerned, the supply position had been made much easier by the development, in the nineteen-thirties, of the solvent refining process.<sup>2</sup> This process made it possible to obtain from Caribbean and Middle Eastern crude oils lubricating stock for engines hitherto available from only a limited range of crude oils in the United States and Russia. It was calculated that the solvent plants within Britain would be able to meet all Service requirements for engines, other than aircraft engines. (Civilian engines could make do with ordinary lubricants if necessary).

However, solvent refined lubricating stock could not withstand the much higher temperatures obtaining in aircraft engines. Aircraft lubricants had to be based on a special lubricating stock called bright stock, and this was only obtainable from American or Russian crude oils. To meet this difficulty the Air Ministry laid in its own reserves of bright stock. The Air Ministry also offered long-term supply contracts to induce the supplying firms to build up reserves themselves in places where the Royal Air Force could draw on them. This effort was not very successful; only one firm found the Air Ministry's offer attractive enough to undertake manufacture and storage of a product for which there was still so little peace-time demand. Rather surprisingly the Government seems to have taken no account of a new refining process which, if quickly developed, could have solved its problem for it. This was the duosol process which could produce a stock with the characteristics of bright stock<sup>3</sup> from Middle East or Caribbean crude oils. The process was certainly

<sup>1</sup> Lubricants used in engines required special qualities. To lubricate an oil must be viscous. But viscosity is a characteristic which varies inversely with temperature. Withstanding the high temperatures reached in engines requires lubricants which are not only more viscous than ordinary machine lubricants at the temperature of the atmosphere, but which also possess the quality of not varying much in viscosity through a wide range of temperatures—that is they must have what is called a high 'viscosity index'. They must also be 'stable', that is they must not develop gummy or resinous deposits by chemical combination with the oxygen in the cylinder gases.

<sup>2</sup> In this process the aromatic hydrocarbons responsible for instability and low viscosity index are separated from the rest by making use of their different solubilities in liquid solvents, such as sulphur dioxide.

<sup>3</sup> Bright stock was a very heavy residual product which could only be recovered from non-bituminous crudes such as those of Pennsylvania, because of the difficulty of separating the lubricating oil stock from the bitumen in the residual mixture left after heavy 'asphaltic crudes' had been distilled. This difficulty was overcome by using one of the refinery gases, propane, as a solvent. By combining this 'propane de-asphalting' with ordinary solvent refining in the duosol process it became possible to produce a very heavy lubricating stock, with characteristics similar to bright stock, from a wide variety of crudes.

known to the Government. In 1934 a small British company, Herbert Green and Company Ltd., had been set up to exploit it. But the company ran into difficulties and, in 1936, after vain appeals to the Government for financial aid, the company was forced into liquidation.<sup>1</sup> Nothing further was done until 1939 when Shell, who were part owners of the patent, decided to add a duosol plant to its refinery at Stanlow on the Manchester Ship Canal. The Air Ministry then offered to buy all the output—which was planned to be equal to the annual war-time requirements of the Royal Air Force for bright stock.

In its approach to the problem of aviation spirit supply the Air Ministry acted more quickly and vigorously. Success here was of greater importance. The use of inferior lubricants in aero-engines would have increased wear and tear on them and reduced their mechanical reliability. But the use of fuel below Air Ministry standards would have more directly impaired the flying performance of the aircraft. In engines with a high compression ratio—which improves thermal efficiency, and therefore the power they can develop—the fuel shows a tendency to detonate or ‘knock’ during combustion, causing the engine parts to overheat and ‘seize’. The quality of resistance to ‘knock’ is measured according to a scale of ‘octane numbers’.<sup>2</sup> For most of its engines in service the Royal Air Force required a fuel with an octane number of 87, as compared with a rating of 70–76 used in those days in motor vehicle engines. Petrols rich in aromatic hydrocarbons, such as those refined from East Indies crudes, have a higher degree of resistance to knock than petrols from paraffinic crudes; and this resistance could be increased still further through the use of an additive, tetraethyl lead. In 1936 a company was formed in Britain to undertake the manufacture of ‘lead’ within six months of the outbreak of war. Unfortunately at that time, for technical reasons, tetraethyl lead could not be used in a higher concentration than 4 c.cs. to the (Imperial) gallon and ‘straight-run’ petrols which could be raised to an octane rating of 87 by 4 c.cs. of ‘lead’, were not available outside the United States in sufficient quantity to meet all the Air Ministry’s requirements. The sources would have been wider if petrols produced by the refining process known as ‘cracking’ could have been used, since these had good anti-knock characteristics. ‘Cracked’ petrol was

<sup>1</sup> Aero-engines in those days required only ordinary solvent-refined lubricants.

<sup>2</sup> The ‘anti-knock rating’ of a particular fuel is established by comparing engine behaviour under standardised conditions when using it with the same engine’s behaviour when using a mixture of two liquid hydrocarbons—iso-octane and heptane—whose performance separately is taken to represent the upper and lower limits respectively of the scale of ‘anti-knockability’ which runs from 0 to 100; thus a fuel giving the same performance in the test engine as a mixture of 87 parts of iso-octane and 13 parts of heptane is said to have an octane rating of 87.

unacceptable, however, since it tended to deposit gum in storage and in the aircraft engines.

Another way of raising the octane rating of a petrol was to blend it with iso-octane, a hydrocarbon which was available in strictly limited amounts. During the nineteen-thirties it was manufactured by polymerising (i.e. combining) a mixture of butylenes to form unsaturated ‘iso-octylenes’. These were then saturated with hydrogen (i.e. hydrogenated) to form iso-octanes. This process, which originated in the United States, was not used elsewhere because the market was insufficient to offer a commercial incentive. In 1937 the Air Ministry decided to provide that incentive. It agreed to take 17,000 tons a year of iso-octane from Trinidad Leaseholds Ltd. for five years, 32,000 tons a year for five years from Shell and 25,000 tons for three years from the Standard Oil Company (New Jersey) with the proviso that quantities would be doubled in case of emergency. Standard Oil Company (New Jersey) was to supply the iso-octane, not from the United States but from its refinery on the Dutch West Indies island of Aruba.<sup>1</sup> Negotiations also took place with the California Texas Oil Company (Caltex) for production at Bahrain, but were without result because the company required more extensive financial assistance. However, the Anglo-Iranian Oil Company also constructed two iso-octane plants, without any contract guarantee, at its refinery at Abadan at the head of the Persian Gulf.

These measures solved the supply problem as it originally appeared to the Oil Board. Early in 1939 it was estimated that the Royal Air Force would be able to draw on productive capacity, outside the United States, of more than 850,000 tons of 87-octane petrol a year; consumption in the first year of a war against Germany was expected to be only 650,000 tons.

But by 1939 the Air Ministry was already at grips with a much bigger supply problem. The 1938 Munich crisis had led to the adoption of another big programme of Air Force expansion. This meant that by 1941, if the country were then at war, an expanded Royal Air Force would be consuming some 700,000 tons of aviation petrol a year in first line operational aircraft alone (as compared with just under 300,000 tons under previous calculations). Moreover this petrol would have to be of 100-octane rating (instead of 87) for use in new, higher compression ratio engines. Since these engines would not be able to function on 87-octane fuel it was of the utmost importance that certainty of 100-octane fuel supplies should be guaranteed.

The prospects of securing sufficient supplies of 100-octane fuel in

<sup>1</sup> See Map facing p. 283.

addition to the 87-octane petrol required for non-operational flying looked doubtful when the Air Ministry decided to make the change. The limiting factor was the supply of iso-octane, which could only be obtained from refineries which possessed 'cracking' plant. And at these the output of iso-octane was restricted to a mere 2 per cent. of refinery throughput.<sup>1</sup> In the autumn of 1938 the Government set up a committee to find a solution to the problem. Its members, drawn from the leading oil companies, from Imperial Chemical Industries Ltd. and from the Air Ministry, sat under the Chairman of the Fuel Research Board, Sir Harold Hartley, F.R.S. It reported in December 1938 and its proposals were approved by the Committee of Imperial Defence in January 1939.<sup>2</sup>

The Hartley Committee proposed that three new plants should be built to manufacture iso-octane in conjunction with a high octane 'base' petrol, blended to yield 720,000 tons of 100-octane spirit a year. The 'base' petrol would be manufactured by the hydrogenation process already being used to treat creosote at the Imperial Chemical Industries plant in Billingham.<sup>3</sup> The butylene needed for manufacture of the iso-octane,—hitherto obtainable only through the 'cracking' process—was to be manufactured by a new and virtually untested process, involving the 'dehydrogenation' of part of the butane. The committee also recommended that a small pilot plant be set up at Billingham to obtain operating experience in this technique.

Because of the danger from air attack, the Hartley Committee recommended that only one plant should be built in this country. The other two plants were to be constructed in Trinidad, which was not only British territory but also the nearest supply area to Britain. The charging stock for the Trinidad hydrogenation plants was to be gas oil from the island's own resources. For the United Kingdom plant the committee considered using creosote as charging stock which would have made production independent of overseas supplies. But Trinidad gas oil offered twice as big a petrol yield as creosote for the same quantity of hydrogen employed.<sup>4</sup> And in the end the committee recommended using gas oil at the United Kingdom plant as well. But the United Kingdom plant was to be so designed that it could be switched over to work on creosote if gas oil supplies from Trinidad were cut off.

This project, which called for a considerable capital investment in technical processes still unproved, and in equipment which might lie idle if war did not come, was clearly beyond the ordinary scope

<sup>1</sup> The limiting factor was the output of 'butylene'.

<sup>2</sup> Air Ministry Aviation Fuel Committee.

<sup>3</sup> See p. 22.

<sup>4</sup> Progress in the Hydrogenation of Coal and Tar, by K. Gordon. Paper presented to the Institute of Fuel, 9th December 1946.

of commercial enterprise. Therefore the Air Ministry took the responsibility on itself. To assist it on the technical side, the Ministry called in two companies which had had the widest experience of the processes to be employed, namely Imperial Chemical Industries Ltd., the pioneers of the hydrogenation process in Britain, and Shell, which built the first European iso-octane plant at Pernis in Holland in 1937. These companies joined forces with Trinidad Leaseholds Ltd., suppliers of the feedstock, to form a company, Trimpell Ltd., which was to supervise construction and operation of the plants. A sub-committee of technical experts drawn from the Air Ministry and the companies was set up to co-ordinate their design and technical development. Work on the first of the three plants began in the spring of 1939 at a site at Heysham, on the Lancashire coast, which was considered relatively safe from German air attack.

It is possible to criticise the policy recommended by the Hartley Committee. Technically it was a gamble. Not only was the dehydrogenation process untested but the output of 100-octane spirit was calculated on the assumption that it would be possible to raise the 'lead' content of the petrol from 4 c.cs. to 7 c.cs. to the gallon—an assumption which time was to prove too sanguine. Moreover, as the committee itself acknowledged, cheaper and more efficient methods of manufacture were already being developed.<sup>1</sup> But these are the criticisms of hindsight. In January 1939 there was no time for a prudent and leisurely attendance on the outcome of further research; there was only just time indeed for the plants to be built by 1941. And the building of the plants seemed the only means of making absolutely certain that the performance of British aircraft would keep abreast of technological advance. It was true that by 1939 it seemed increasingly unlikely that the American supplies would be withheld. But to have accepted anything less than absolute certainty, to have depended on the goodwill of foreign suppliers to meet the essential needs of the Royal Air Force, would have been a radical break with traditions that had governed British oil policy since long before the First World War.

So much for the supply of oil products. What of the means of shipping them? Imports into Britain during the first year of war would not only be considerably greater than in 1938, but they would have to be carried in a tanker fleet working at less than normal efficiency. For one thing it was intended to introduce the convoy system right at the beginning of the war. This meant that tankers would be subject to delays in waiting at rendezvous points, to slow travelling while under escort, and to unusual delays in port because of the 'bunching' of arrivals. There was a further possibility which

<sup>1</sup> See p. 260.

was taken very seriously—that movement through the Mediterranean Sea might be denied to British shipping because of Italian hostility. In July 1936 the Committee of Imperial Defence had decreed that use of the Mediterranean route should no longer be taken for granted. This meant that oil supplies from the Middle East, on which Britain proposed to rely heavily, might have to be shipped around the Cape of Good Hope; the longer route would greatly increase the shipping effort required to supply Middle East oil.

Nevertheless, a careful analysis of the numbers of tankers which were likely to be available produced reassuring answers. There was no question of British or other Empire-flag tonnage being able to carry out the whole shipping task by itself, even after allowance had been made for the part-time service of British whale-oil vessels and the switching of a number of tankers normally used to carry molasses to the carriage of petroleum. But the Oil Board believed that there would be no difficulty about securing the services of foreign tankers; indeed they counted with absolute confidence on being able to dispose of the equivalent of 150 tankers of 10,000 tons capacity. This would give them far more than they would actually need if the route through the Mediterranean remained open; more even if the use of the Mediterranean were denied them, provided that liftings from the United States could replace liftings from Iran. Only if United States oil were withheld in a European war against both Axis partners did it look as if the tanker tonnage position might be a tight one. In that extreme case, it was calculated there would be a need for 156 neutral tankers, or six more than would be available.<sup>1</sup> Table 2 shows the details.

These forward estimates of tanker requirements were based on assumptions—for instance, about the number that would be lost through capture—that were no more than a best guess. They clearly left wide room for error on either side. Nevertheless the authorities, somewhat naively, treated them as if they were exact and definitive calculations, and the Committee of Imperial Defence pressed the Oil Board to take steps to remedy the deficit it foresaw. Understandably, the Board's response was far from vigorous. In the spring of 1938 it gave authority for the purchase with public money of any tankers being sold for scrap, and for the holding of such purchases as a war reserve.

<sup>1</sup> The way in which the estimate of tanker requirements was arrived at may be of interest. It was reckoned that about 25 million tons of oil would have to be transported by ocean-going tankers during the first year of a war against Germany and Japan (rather more against Japan alone since then there would be no rationing in Britain, and rather less in a war confined to Europe). The Oil Board estimated the number of tankers that would be required to carry this quantity from the selected supply sources by allotting all British-flag ocean-going tankers to appropriate supply routes and then reckoning how much more tonnage (expressed in terms of vessels of average size) would be needed on each route.

TABLE 2  
Proposed Oil Supply Programmes of the British Empire for the First Year of War (1940)

	Millions of Statute Tons											
	Oil from United States fully available						Oil from the United States available only to Canada					
	German War		Japanese War		Dual War		German War		Japanese War		Dual War	
	28·6	30·3	29·1	28·6	30·3	29·1	25·2	25·7	25·2	25·7	29·1	
Total estimated consumption												
Proposed sources of supply: U.S.A.	Mediterranean open	24·4	25·7	24·9	25·2	24·9	25·2	25·7	25·2	25·7	—	—
	Mediterranean closed	35%	53%	43%	16%	37%	16%	15%	16%	15%	—	—
Caribbean	19%	—	22%	33%	22%	22%	33%	31%	33%	31%	—	—
Iran	37%	—	29%	36%	36%	36%	36%	34%	36%	34%	—	—
East Indies	4%	—	Nil	9%	Nil	Nil	9%	Nil	14%	Nil	—	—
Other*	5%	—	5%	6%	—	6%	6%	20%	5%	20%	—	—
Number of 10-knot tankers of 10,000 tons cargo capacity required	372	407	364	414	364	332	447	436	447	436	—	—

\* That is, Burma, Iraq, Bahrain, Peru and Ecuador and, in a war against Japan alone, Roumania and Mexico. Mexico had been excluded from the more likely hypotheses in 1938, as a result of the embargo which the British placed that year on the purchase of Mexican oil.



Twelve months later an air of greater reality was injected into these proceedings when the Treasury, for the first time in this context, indicated that the supply of American goods, including oil, might be restricted in time of war by lack of the means to pay for them. The contingency of tanker shortage thus became more likely. Nevertheless the Government still made no determined effort to bridge the deficit. In April 1939 it announced a scheme to subsidise the building of new merchant ships. But it confined this to dry-cargo vessels only. To increase the number of tankers it simply widened its hunt for second-hand ships. In future, it decided, it would buy tankers with some economic working life left in them as well as tankers on offer for scrap—provided, of course, that there were no private British buyers already in the market. But the price it was prepared to pay for these rather better tankers was strictly limited—and the results it achieved were equally so. By the outbreak of war not a single foreign tanker had been purchased, although negotiations were in train for several. Nor had the Government been able to find any scrap vessels that it could buy, and thought worth buying. It did buy three British vessels, which would otherwise have been sold to foreigners thereby increasing the 'deficit'. The usefulness of this broad calculation and the 'action' which it prompted the authorities to take seem equally open to question.

More worth considering than the validity of these pre-war calculations, however, is the premise on which they were based, namely, that far more tankers would be available for work in British and Empire trades in war-time than normally worked in them in time of peace. What explains this assumption? It rested in the first place on the postulate that the international oil companies would make every effort to keep supplying their normal markets in Empire territories and thus, to the extent that British-flag tankers were compulsorily switched from civilian to military cargoes, they would strive to replace them by non-British-flag tonnage under their control. This was a reasonable assumption which events were to justify. But where were these replacement tankers to come from? They would be drawn, it was implied, partly from trade with 'enemy and contiguous countries' which would be curtailed or interrupted by British naval blockade. But the number of neutral tankers normally engaged in supplying Germany—whose seaborne oil imports were relatively small—and other Axis countries, was certainly not sufficient to cover all the extra British war-time needs. Nevertheless, towards the end of 1938, when the Sea Transport Department compared the number of neutral tankers in existence with likely neutral tanker needs under war conditions it came to the comforting conclusion that there would be at least 300 available for Allied use; this was after discounting tankers flying the United States flag which

were barred from ports in the war zones and in any case, fully occupied in United States trade; and discounting also all Italian and Japanese-flag tankers surplus to the requirements of those nations. The inference must be that there was a considerable world surplus of tanker tonnage in the late 'thirties, which constituted, in effect, a hidden reserve for the Allied war effort.<sup>1</sup>

(v)

## War Reserves

In their review of the war prospects in 1913 the Royal Commission on Fuel and Engines<sup>2</sup> had laid particular stress on the importance of holding large stocks in reserve. The Admiralty had accepted this policy. By the early nineteen-twenties it had accumulated oil reserves at naval bases throughout the world; and, despite the 'Ten Year Rule' went on adding to them. Its object was to bring naval stocks in Britain up to 3½ million tons, the equivalent of six months' war consumption; and by 1936 all but half a million tons of this was in place.

As for the Army and Royal Air Force the Oil Board recommended—and the Committee of Imperial Defence agreed—that each Service should lay in six months' stocks of petrol and lubricants for motor vehicles and aircraft as quickly as possible. Nearly two years later, in the spring of 1938, the uncertainty about supplies both of aviation petrol and lubricants led to a decision to raise the Air Ministry's stock target by nearly a third. In the spring of 1939, the Air Ministry target level was raised to the equivalent of more than a year's consumption. Nor were stocks to support civilian consumption neglected. These were normally held by the oil companies. At the end of 1936, after talks with the Government, the companies agreed to raise their stocks to the equivalent of three months' peace-time consumption.

In fixing the target for Service stocks, the Committee of Imperial Defence had urged the need for haste. Nevertheless, progress in stockbuilding was slow. By the outbreak of war none of the three Services had built up their reserves to the authorised level. The hold-up was not in procuring the oil, but in providing the new tankage to house it at a time when, because of rearmament, there was stiff

<sup>1</sup> During the summer of 1938, when the British began trying to buy second-hand vessels, there had been about 120 tankers laid up throughout the world.

<sup>2</sup> Royal Commission on Fuel and Engines (H.M.S.O. 1913).

competition in Britain for materials and labour. There was also the need to ensure that the new storage tanks were reasonably safe from destruction from the air, for stocks in vulnerable storage could obviously give no strategic security. This problem made their construction a slower and more costly business.

This need to guard against air attack, moreover, greatly increased the size of the storage task. It meant that, in addition to building storage for new stocks, there could also be need for new storage to replace the more vulnerable tanks already in existence. Most oil stocks in Britain were held at ports in 'main installations' into which tankers discharge their cargoes; a small quantity—about 15 per cent. of total stocks in Britain before the Second World War—were held at other distribution depots from which retailers and consumers received their supplies. The United Kingdom port installations consisted of nests of enormous cylindrical tanks sited near conspicuous landmarks, and offered easy targets for aircraft. In a report dated July 1936 the Air Raid Precautions Department of the Home Office attempted to assess the effects of German air attacks on oil installations at ports along the east and south-east coast. Its findings were pessimistic. About a third of the country's civil oil storage capacity was concentrated along the Thames Estuary. About these tanks the report said categorically, 'it is perfectly plain that if a determined attack was made on these installations nothing could save them'. It added that the oil installations along the Humber and on Southampton Water were equally exposed.

The ideal solution of course would have been to bury the whole 'strategic oil reserve'—including both civil and Service stocks—well below the ground where they would be safe from even a direct hit. The Germans tried to do this, but to the British it seemed impracticable. It would have cost too much in manpower and resources and could not have been anywhere near finished by 1940. Instead the Government limited its aim to seeing that all war reserve stocks were sited, as far as operational factors permitted, west of a line drawn from the Tyne to Southampton Water; this was classified as a 'relatively secure' area by the Air Ministry since it was protected by the line of anti-aircraft defences stretching across the middle of the country. In physical terms this policy implied that the Air Ministry and the War Office between them would have to build enough storage to house about a million tons of aviation spirit and petrol; and that as much again would have to be constructed to build up civil oil stocks west of the line.

The two Service departments went ahead with these programmes right away. The Petroleum Department, however, undertook to build only just over half the civil storage required. The rest it left to the oil companies to put up at their own expense. It argued, very

justly, that they would have to build new storage anyway to meet their expanding trade requirements and to honour their promise to hold a larger ratio of reserves. But, for obvious reasons, the companies insisted on putting up most of their new storage within more vulnerable areas, and most of it in the Thames Estuary. The Government did its best to dissuade them, but without success. And since, rather illogically, it was not prepared to build this part of the new storage itself simply to ensure that it was built in the west, its plans were to that extent frustrated.

As well as building (or trying to get built) new storage outside the more vulnerable part of the country, the Government also sought to ensure that the new tanks would be so constructed as to be able to withstand the effects of near misses by high explosive bombs, and direct hits by small incendiaries. This required that the tanks should be 'protected', that is partly sunk into the ground and enclosed by a roof and walls of concrete. All the new Petroleum Department tanks and most of the Air Ministry<sup>1</sup> ones were built in this way; and the piling of earth over and around them made them more inconspicuous from the air. The War Office was at first unwilling to go to the extra expense this 'protection' involved; it thought that by choosing isolated sites well away from obvious landmarks, it could give its stocks all the security that was necessary. Accordingly two-thirds of its new storage was of the normal 'surface' kind, although with plenty of space between the tanks. But after a ruling by the Committee of Imperial Defence in 1938 it 'protected' the last two of its new installations (sited near Southampton Water) in the same way as the Air Ministry and Petroleum Department had done. For their part the oil companies gave similar protection to all their new storage on the Thames Estuary and elsewhere; but only after the Government had undertaken to bear half the cost of this extra work.

It has been mentioned that, for operational reasons, some of the war reserve storage—notably that holding naval stocks—had to be put up in the more vulnerable eastern half of the country. For these stocks more costly protective efforts were made. The Admiralty, which had the most ambitious storage building programme, was also most ambitious in the protection it proposed to provide. Most of its surface installations had been built before 1922 and their design was out-of-date; tanks were crowded together at naval bases in a way which made them an easy bombing target. It therefore put forward a plan to re-house, in bomb-proof storage tunnelled deep into the ground, about 2 million tons of stocks stored along the south

<sup>1</sup> Some 50,000 tons of Air Force tonnage at main ports, where there was no point in concealment, was 'surface storage'.

and east coasts of Britain and at bases overseas. The Committee of Imperial Defence sanctioned this in March 1937.

The Air Ministry, like the Admiralty, also had to hold some stocks in exposed forward areas—in this case at inland points from which aviation petrol and lubricants could be conveniently distributed to its airfields in eastern England. These small Air Force Distribution Depots offered less of a target than the huge installations at the main naval bases however; and the Ministry decided that it would suffice to bury their tanks ten feet in the ground, encase them in concrete and cover them to surface level with concrete and earth. The depots would thus be completely invisible from the air and able to withstand a direct hit from a 25 lb. incendiary bomb.

Efforts to protect oil storage tanks from damage were supported by measures to minimise the injury caused when damage was actually inflicted. The intense heat given off by an oil fire frequently causes oil in neighbouring tanks to give off inflammable vapour, so that flames spread rapidly from tank to tank through the installation. To reduce the risk of this in its crowded installations, the Admiralty proposed to 'sterilise', that is empty, some of the tanks, transferring their contents to the new storage which was being built underground.

Another serious hazard was blazing oil spreading through the installation. In peace-time it was the normal practice to guard against this danger by surrounding certain tanks, especially those holding petrol, with walls of earth known as 'bunds', which were able to hold back the oil if it escaped from damaged tanks. At the request of the Government, the oil companies considered building more of these internal bunds to meet the greater fire risks arising from the threat of air attack. In the end, however, they confined themselves to putting up bunds round the perimeter of their installations, to prevent damage to surrounding property. They concentrated their early efforts on the installations in the south and east of the country, where the threat to surrounding property was greatest.

Finally, the Home Office, as the department responsible for air raid precautions, investigated methods of putting out oil fires. It experimented in draining the body of the oil away from beneath its blazing surface, and in stifling the fire with blankets of foam which starved the flames by cutting them off from the oxygen in the air.

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## Ports and Transport

Threat of attack from the air not only menaced the safety of the country's oil stocks; it also raised the very important question of whether Britain's port and inland transport facilities would be adequate under war conditions. Normally some three-fifths of the country's oil imports came in through ports east and south of the line from Southampton Water to the Forth. But if, as the Oil Board concluded, the storage installations at most of these ports would have to be discounted in time of war, then the ports themselves must equally be discounted. It followed that the imports received there would have to be diverted through the ports on the west coast. Would those ports be able to handle the additional traffic?

The Mines Department had begun to consider this question in 1935. It found a good deal of information available to help it; for the Ministry of Transport had already put this very same query in relation to dry-cargo imports. The Ministry had assumed that, in time of war, some three-quarters of all the shipping normally unloading between the Tyne and Southampton would have to be directed to the west coast ports; and, in 1933, it had set up a committee under Sir Cuthbert Headlam to find out whether this could be done. Between 1933 and 1936 the Headlam Committee<sup>1</sup> had taken an exhaustive inventory of the physical resources, including a separate census of oil handling equipment, at all the ports in the country. On the basis of those findings the Petroleum Department concluded, in 1937, that there were enough tanker berths along the west coast between Southampton Water and the Clyde to handle all the tankers coming to Britain in war-time. But as a precaution it decided to increase the number of serviceable berths by equipping a hitherto unused berth in the Manchester Ship Canal at public expense.

A closer look at some problems of handling oil supplies left cause for concern. The three major oil ports along the west coast (Avonmouth and Swansea on the Bristol Channel, and Stanlow on the Manchester Ship Canal) which alone had the facilities for handling a number of large tankers at a time, were, it turned out, particularly vulnerable to dislocation by bombing. Both Swansea and Avonmouth had an elaborate system of oil docks since, owing to the tidal condition on the Bristol Channel, it was dangerous to discharge tankers at jetties on the open water as was the custom at most other oil ports. At both ports the docks had to be approached through a

<sup>1</sup> Distribution of Imports in Time of War Sub-Committee.

single lock entrance which could easily be blocked by a bomb on the lock gates. Stanlow, lying on the Manchester Ship Canal, was also open to the same risk, since all shipping through the Canal had to pass through a single lock at Eastham.

The Petroleum Department therefore suggested the construction of a jetty outside the lock entrance at both of the oil ports on the Bristol Channel. This would permit some tankers to discharge even if the lock itself became impassable. It was more difficult to see what could be done about the approach to Stanlow. For a time the Ministry of Transport thought of constructing a second entrance to the Ship Canal; this would have relieved not only Stanlow but the whole port of Manchester of its dependence on Eastham Lock. The idea was eventually dropped as too ambitious. However, the proposal to build jetties at Swansea and Avonmouth was acted upon, though only after months of discussion. It was not until the spring of 1939 that building the jetties was approved by the Committee of Imperial Defence—two years after the proposal had been first put forward. Since the jetties could have no commercial value the Government agreed to bear part of the cost of building them.

Oil ports must have, as well as berths to receive the tankers, shore storage to receive their cargoes; and the larger and more complex the traffic the greater the storage space needed if unloading delays are to be avoided. No precise calculation of how much, if any, extra storage would be required at the west coast oil ports in the event of import diversion seems to have been attempted. But clearly this point was not lost sight of. Despite the obvious risk of placing reserve war stocks in the neighbourhood of a main port, roughly 700,000 tons of the new Government-built storage capacity was located at the main oil importing centres along the west and south coasts; another 400,000 tons was sited at minor west and south coast ports.<sup>1</sup>

The Petroleum Department also considered a third factor governing west coast importing capacity, namely, the ability of the country's transport system to move the oil inland to points of consumption. Diversion of imports would mean that much of the oil consumed in London and other east areas would have to be moved right across the country instead of being supplied from ports close at hand. This might overload the transport system. A rough calculation made late in 1937 suggested that the transport effort in terms of 'ton-miles' needed to meet civil oil requirements in 1940 if imports were diverted would be 25 per cent. greater than it had been in 1936 under normal conditions, even though civil consumption would be

less in 1940 because of the effect of restrictions. On top of civilian traffic, the oil transport system would also have to distribute supplies to the Armed Forces in Britain.

Oil was normally distributed within Britain by rail, road and water; in 1936 some 52 per cent. of the total ton-mileage was performed by the railways, 33 per cent. on the roads and about 15 per cent. by water transport, (either barges carrying supplies up the rivers and canals, or small tankers moving oil along the coast). The effect of import diversion would certainly reduce the part played by water transport. Over 80 per cent. of the coastwise movements took place between the Tyne and Southampton Water; about two-thirds of the supplies carried by barge went up the Thames and the Humber. True, the coasters and some of the barges might be taken round to the other side of the country. But it was clear that barge traffic, at least, could not be increased on the waterways running from the west coast, (if only because of safety standards) sufficiently to make up for the traffic lost on those running in from the east coast. In sum it seemed that, at the very best, the whole extra transport burden arising from diversion would fall on the railways and roads which would have to take over work normally performed by river barges.

It was, then, on rail and road capacity that the Petroleum Department concentrated when it began to consider the transport implications of a 75 per cent. diversion of imports. During 1936 and 1937 it took a census of all oil-carrying vehicles owned by the oil companies; in October 1938 it enlarged this to take in rail tank cars and tank lorries owned by small haulage firms. From this the Department tried to estimate how many extra vehicles would be needed in the event of imports diversion in 1940, after allowing for the normal expansion of the rail and road tanker fleets in the interim.

The estimate depended, of course, on the efficiency with which the tank lorries and railway tank cars could be used under war conditions. As a war-time measure the companies, united in the Petroleum Board, intended to pool all commercial oil stocks, to adopt standard grades of products and to operate oil-carrying vehicles as a single fleet. This cut out the duplication of journeys which took place when there was full competition. It would also make it possible to operate the rail tank cars more economically. Like other railway goods vehicles, tank cars were usually despatched in general goods trains and travelled across country by devious routes until they reached various loading points where their services were in demand; this meant that a good deal of time was lost in shunting and waiting about in sidings. The oil companies now proposed to despatch their tank waggons in special oil trains travelling on a regular schedule between the ports and the consumption areas fed from those ports.

<sup>1</sup> All the War Office and Petroleum Department storage was sited along the west and south coasts. Of the Air Ministry storage about 50,000 tons capacity was accounted for by the forward Air Force Distribution Depots in eastern England, and about 200,000 tons were Reserve Depots sited inland in the western half of the country.

At a convenient point the trains would be broken up and the waggons distributed between oil depots within those areas. To deal with the loading problems under this method of working they planned to appoint railway movement officers at each main installation. In this way, provided oil traffic received suitable priority, they hoped to cut down to four days the average time spent by a tank waggon between loadings.

This was an optimistic assumption and it was not adopted by the Service departments. These estimated their own rail car needs for what were, admittedly, on the average, longer journeys, on the basis of a seven-day turn-round. As the Petroleum Department pointed out, the four-day estimate took no account of the effect of air attacks on key junctions and marshalling yards: however this was impossible to calculate, and the Department did not try to do so. Even without air raids it was still possible that the scheme of deliveries might not be maintained. Unlike traffic on the roads, the volume of railway traffic is restricted within limits set by the character of the rail network, for instance by the number and location of junctions. The limits of the British rail system might well prove too narrow when not only a large part of the country's oil traffic, but the bulk of her dry-cargo imports as well, were being railed inland from the west coast by unusual routes. Neither the oil companies nor the Department considered this question and indeed they were not competent to do so. The railway companies themselves were not consulted until January 1939: then they did not challenge the feasibility of the four-day turn-round. They did insist, however, that the oil companies should base their plan of railborne movements on those ports, depots and breaking-up points most convenient from a railway working point of view, and on train paths which they should select. The oil companies agreed to do so.

To have achieved a four-day turn-round would have almost doubled the effective carrying capacity of the rail tank car fleet. Even so, it was reckoned, import diversion would lay an extra burden on road tanker haulage as well. In normal times most of Britain's tank lorries were used on relatively short runs between oil distribution depots and the retailers and consumers who were fed from them: only lorries with a capacity of 10 tons or more were used on movements between the port installations and the distribution depots. In the event of diversion, however, the oil companies intended that all movements to depots within a range of about seventy miles from the west coast should be carried out by road. This they proposed to do, not by increasing the number of tank lorries, but by using those that they had more intensively. Normally most company-owned road tankers were used for only about eight hours in twenty-four; by working them on double shift, the carrying

capacity of the long-distance fleet would be increased, with vehicles engaged on deliveries to consumers by day being used on the night shift to carry oil from installations to depots. Sunday working and the raising of the speed limit on big vehicles offered other possibilities of improving carrying capacity. This method of working would call of course for extra drivers. During 1938 and 1939 the oil companies began to recruit and train new men.

Though no exact calculations were attempted, these plans, and the assumptions based upon them, made it seem that the oil company vehicles would be sufficient to cope with the inland transport task, including the supply of aviation spirit, even in the unlikely event of the east coast oil ports being shut down entirely. Down to the end of 1938 therefore, no steps were taken to get additional ones built. But the post-Munich decision to increase the strength of the home-based air force forced a re-assessment of requirements. This suggested that there would ultimately be a shortage of rail tank cars for carrying petrol. Therefore, in January 1939, the Air Ministry, with Oil Board approval, placed an order for the construction of another three hundred cars.

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### Liaison with the French

What precisely had the planners achieved by the late summer of 1939? After much calculation and some investigation they had come to the conclusion that comparatively little needed to be done. On the supply side it had appeared that aviation petrol and lubricants might be short if United States supplies were not available. This became increasingly unlikely after 1937; but nevertheless steps were taken to develop alternative sources. If Italy entered the war the tanker situation might be tight; but again only in the unlikely contingency of American 'unfriendliness'. Prompted, however, by the Committee of Imperial Defence, the Oil Board had rather belatedly set in motion a timid programme of buying up old vessels at bargain prices, with results which were insignificant. On the administrative side the broad outlines of a war control had been prepared before September 1938, though a last-minute scamper had been necessary to organise the oil industry. A petrol rationing scheme was also ready, though experience during the Munich crisis led to it being modified later.

The main effort in pre-war preparation was devoted to meeting the threat of air attack. The record here was far from impressive.

Although a devastating assault from the air was expected as soon as war broke out preparations and defensive measures had gone ahead very slowly. It was right to be cautious in launching new capital projects, since Britain's material resources were not unlimited. But the rate of progress between official sanction for projects, the award of contracts and the start of work was slow. As a result, in September 1939 Britain was still relying to a large extent on oil storage asserted to be unsafe. Work on the programme for new underground naval storage had begun, but not a single new tank was ready for use. Less excusably, because the task was less formidable, only a third of the new Air Force storage was ready. Work on the new 'protected' storage which the Petroleum Department had decided to put up in the west of the country, was given lower priority, and was only just starting. Work on the jetties to be built outside the oil docks at Swansea and Avonmouth had not begun at all. These projects for jetties, indeed, can be regarded as another example of precautions, which could hardly be regarded as adequate, being taken against a disaster which could hardly be regarded as likely. They were handled with little sense of urgency. Two years between initiation and approval was too long by any yardstick; and when war broke out six months later, the jetties schemes were still being bandied about between Departments. In the event the experience of the war itself was to show that the experts had been far too pessimistic about the effect of air raids. Britain's oil supply and distribution system was much safer than it looked on the eve of the war. But the pre-war planners can take no credit for this.

Before going on to examine the actual experience of war, one further question needs to be considered. How well prepared was the British oil economy to function in co-operation with that of the country which, as had been plain for a very long time, would be fighting side by side with Britain when that war came?

The answer, before Munich at least, was—not at all. In those days British oil planning was distinguished by the absence of collaboration with the French. It was not until the autumn of 1938 that any attempt was made to correlate the supply plans of the two nations or to establish any kind of working contact between the Petroleum Department and its counterpart in the French administration.

The fault lay entirely with the British. Right down to the time of Munich, influential opinion in Britain remained opposed to the idea of a formal alliance with France against Germany. Even as late as the spring and summer of 1938, voices in Cabinet were raised against any co-ordination of defence plans with Britain's only powerful continental friend 'lest the idea should get about that we were engaged in the preparation of a set plan for the encirclement of

Germany'.<sup>1</sup> The Service departments supported this attitude, at least where oil questions were concerned, since they were unwilling, for reasons of security, to allow the details of their oil requirements to be divulged abroad. Nor can the Petroleum Department itself be acquitted of all responsibility. Although it did not originate this policy of isolation, it acquiesced in it without protest, and left the initiative in pressing for closer collaboration in oil matters to the Foreign Office and the Food (Defence Plans) Department, whose particular responsibilities made them more directly and vitally concerned with the maintenance of good relations between Britain and France.<sup>2</sup>

The fact was that, for the British, an attitude of this kind was easy to maintain. With her wide command of petroleum resources and her large fleet of tankers, Britain was, or seemed to be, very nearly self-sufficient in oil; she was therefore in a position to formulate her supply policy and draw up her import programme without taking cognisance of the intentions of the French. For France, on the other hand, collaboration with Britain was clearly a prime necessity. The French drew many of their supplies from sources where British influence was preponderant, and even in time of peace they depended for about 16 per cent. of their imports on the services of British tankers. Failing some knowledge of British requirements, they could neither plan their own supplies nor arrange for them to be transported; moreover, without some guarantee of British intentions, any arrangements that they did make could be little more than provisional.

Not surprisingly then, the first overtures came from Paris, and were put forward as early as March 1937. They met little response; it was not until the beginning of June 1938 that the Petroleum Department was authorised to agree to the French request for official conversations. A first formal meeting between British and French oil representatives took place in London on 13th June 1938. Its results were very disappointing to the French who were still denied the information they so urgently required. The British gave no indication of the scale of their own requirements, nor of the extent to which they would be likely to call upon neutral tankers. Moreover, they condemned as premature a French suggestion for the setting up of joint committees to deal with the various aspects of co-operation. Another three weeks were to pass before the Cabinet authorised an exchange of estimates; and even then the British representatives were

<sup>1</sup> On 30th June the Air Minister argued that the Government 'ought also to avoid taking any steps which would commit them to an alliance with France against Germany, and the definite preparation of a war plan with France to meet such a contingency. This was the sort of way in which the seeds of the next war might be sown'.

<sup>2</sup> In the case of food the British had taken the initiative in proposing talks and the French strove to link food plans and oil plans together.

strictly enjoined not to enter into any commitments. In the weeks which followed, preparations for another meeting proceeded with very little sense of urgency; and it was not until 14th September 1938, the very day of the Prime Minister's first flight to Germany, that the French representatives paid their next visit to London. Even this meeting was nearly postponed owing to the failure of the French to furnish detailed estimates of their requirements in advance, as agreed. This was suspected to be due to annoyance at the way they had been treated in June.

Munich put an end to this phase of isolationism. It also gave the two countries a chance to get down to serious collaboration before war came upon them. The first task was to re-examine the world supply picture in the light of their combined needs. The results of a preliminary survey were reassuring. For aviation petrol, France would have to depend on the United States. For other products there would be no supply difficulty. When the British and French representatives met again the following February, they agreed that all that was required was a few changes in British supply arrangements to avoid overlapping with those of the French.

The question of sea transport seemed likely to be more difficult. In war-time French oil imports were expected to exceed their pre-war level by more than 40 per cent.; and even in peace-time France could import only 40 per cent. of her needs in French-flag tankers. This was why the French had been so impatient to find out how much British and neutral tonnage they would be able to use. In December 1938 shipping representatives of the two countries met to consider the position. They agreed that in war-time the vessels of each nation would be used in the best interests of their joint cause; this meant that British tankers would be at the disposal of the French to the extent that France's need could be shown to be greater than that of Britain. The two sides then considered their joint requirements for neutral shipping. First if the Mediterranean were open and secondly, if it were closed. Once again the British were reassuring. The estimate of the Sea Transport Department that there would be at least 300 neutral tankers available to meet British and French needs has already been mentioned.<sup>1</sup> 'On the most unfavourable hypothesis, that of a closed Mediterranean', it was asserted at a joint meeting on 9th February 1939, 'there would be sufficient tanker tonnage available . . . after meeting the estimated needs of neutrals, to meet both French and British requirements'.<sup>2</sup>

<sup>1</sup> See p. 60.

<sup>2</sup> If the Mediterranean were open Britain would need 39 neutral tankers and France 1,300,000 deadweight tonnage or roughly 130. If the Mediterranean were closed Britain would need 35 and France approximately 100.

Besides reviewing the supply prospects, the British and French officials also considered the setting up of joint controlling machinery. The problem here differed notably from that of the First World War. In 1918 tanker shortage had been the outstanding problem, and an Inter-Allied Petroleum Conference had been set up, with the task, among others, of adjusting the oil demands of the four Western Allies to the tonnage which was available.<sup>1</sup> In 1939 there was no tanker shortage in sight and, therefore, apparently no need for inter-Allied machinery to allocate oil supplies. There was, however, an obvious need to collaborate in the procurement of supplies if only to prevent competition between Britain and France from forcing up world prices. It was decided to leave this to the oil companies. The companies were to operate, however, within the framework of a general programme of supply to be laid down by the two governments, who were expected to keep in touch through a French Oil Mission established in London.

On the other hand, some form of joint organisation for tankers did seem to be required, since a genuine pooling of tonnage would necessarily involve the common control of tanker movements. In 1918, this task had also been performed by the Petroleum Conference but in 1939 it was decided, following the practice which had been adopted in the internal arrangements of each country, to give the task of tanker allocation to a general inter-Allied shipping organisation which was to be set up to direct the use of all merchant vessels, British, French and neutral, under Allied control. Neutrals would be procured in such numbers as this joint organisation might direct, and once procured they would be allocated by it, between every voyage, to one or the other of the two countries. To prevent charter rates from being forced up, the two countries agreed to unite in securing the services of these neutral tankers.

Thus by the spring of 1939 it seemed that the broad principles of co-operation in oil matters had been mapped out. But a closer scrutiny suggests that Britain and France were still far from an effective partnership when war broke out. Since they anticipated little difficulty over supplies and shipping, the French and British representatives had been under no pressure to take more than a cursory glance at Allied needs and problems. For example, they failed to work out the basis of a genuinely co-ordinated import policy. Whereas Britain was obliged to import mainly refined products, the French were proposing to import about five-eighths of their supplies in the form of crude oil. Clearly it was desirable to find out how far these conflicting policies could be reconciled with a full pooling of

<sup>1</sup> *History of Ministry of Munitions*, Vol. VII, Pt. III, Ch. X and Vol. VII, Pt. V, Ch. I (H.M.S.O. 1922).

resources. But this divergence between the two import policies aroused little or no comment before the war began.

Equally important, preparations for the setting up of a combined war control might have been more effective if they had included a joint survey and criticism of the administrative arrangements within each country. A proposal to set up a nucleus of the joint shipping body in time of peace to examine, among other things, the British and French plans for shipping control, unfortunately came to nothing. So it was that a number of weaknesses in the French system which were to hinder the working of the combined machinery were overlooked, until they were exposed by the stress and strain of war.

One final point must be made. No inter-Allied machinery, however well-designed, can be wholly successful unless those who work it are bound together by a sense of common purpose transcending separate national standpoints. But a sentiment of this kind cannot be created at short notice by a conscious effort of will; it grows naturally out of the habit of thinking and working together on common aims and problems. French and British representatives never met until shortly before Munich and only twice in the twelve months which followed;<sup>1</sup> and when they met they confined themselves to a comparison of estimates and programmes. Not only their plans but their association itself might have been the stronger for a more searching analysis of what they would have to face together when war came.

## PART II

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### Warm War

Autumn 1939—Summer 1940

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<sup>1</sup> On 14th September 1938 and 9th February 1939.



## CHAPTER III

# THE BEGINNING

(i)

### The Oil Control

THE pre-war planners were close to the mark in adopting 1940 as the first war year; war against Germany began on the 3rd September 1939. Immediately the plans for war-time administration came into effect. The United Kingdom oil companies joined forces to establish a headquarters at Shell-Mex House in London. Here two joint company committees, an Overseas Supply Committee and a Tanker Tonnage Committee were established to organise supply and shipment of all oil products required in Britain with the exception of naval oil fuel. This, the Admiralty continued as in peace-time to buy and ship for itself, mainly in tankers which had been requisitioned.

Shell-Mex House also became the seat of management of the Petroleum Board which, by a Statutory Order issued on 13th October 1939, was given a monopoly in the United Kingdom<sup>1</sup> and handled the distribution of all oil supplies within the country, whether for civilian or Service use. The Petroleum Board contained two 'pools' of firms. The main pool, which dealt with oil products other than lubricants, was set up in accordance with the agreement signed by the four main United Kingdom importing and marketing firms in March 1939. A week after the outbreak of war these four were joined by thirty-three smaller importing and marketing firms who signed a final and definitive agreement with the original members on 23rd May 1940.<sup>2</sup> Another fifty-four firms which marketed

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<sup>1</sup> Petroleum (No. 2) Order, 1939, (S.R. & O. 1939 No. 1447). This made it an offence for any person or body other than the Petroleum Board to sell or supply petroleum or benzole without a licence from the Secretary for Mines. The Secretary undertook not to grant a licence without consulting the Board.

<sup>2</sup> An eleven-member committee of management was appointed consisting of three representatives each from Shell-Mex and B.P. Ltd., and the Anglo-American Oil Company; and one each from the National Benzole Company, Trinidad Leaseholds Ltd., and the Texas Oil Company. Of the other two, one represented the 'independents' and one was the Chairman of the Lubricating Oil Pool. Sir Andrew Agnew presided over this committee of management as independent, non-voting chairman.

oil within this country but did not import it themselves, ceased operations and allowed their physical assets to be taken over: by an agreement signed on 8th April 1940, these firms were granted a share in the profits of the pool's operations based on the amount of their normal business.<sup>1</sup> Thus the Pool acquired control of all the oil distribution facilities—installations and depots, tank waggons and lorries and barges—within the country.<sup>2</sup>

Meanwhile the principal lubricating oil importers who had pooled their lubricating oil distribution facilities in forming the Lubricating Oil Pool on the eve of the war, had also been joined by the smaller importers of lubricants. Unlike the main pool, however, the Lubricating Oil Pool did not absorb the non-importing firms after the outbreak of war. It would have been extremely difficult to standardise the enormous number of varieties of finished lubricants which the 'blending firms' were accustomed to sell to industrial consumers; and it was finally decided to leave these blenders to carry on as before and to confine the operations of the Lubricating Oil Pool to the importing and wholesaling of lubricating oil 'base stocks'.<sup>3</sup> Thus, firms distributing finished lubricating oils continued throughout the war to market their own products to their own specifications with full use of brand names. This meant of course, a potential waste of transport capacity. To avoid this wastage neighbouring firms set up joint committees to operate their tank waggons in common.

Through these arrangements the United Kingdom oil firms placed at the disposal of the Government an instrument for organising the movement of oil supplies through every stage, from procurement overseas to physical delivery to the consumer (or retailer) in Britain. The vertically integrated character of the major companies made it easy to keep supply and shipping arrangements flexible and the monopoly exercised by the Petroleum Board enabled it to wring the utmost from transport facilities. In most of its activities Shell-Mex House worked under the supervision of the Petroleum Department, an arrangement which ensured that the operations of this vast supply

<sup>1</sup> These firms did not become members of the Pool but each was affiliated to that member of the Pool from which it had formerly obtained most of its supplies; from this member the firm received amortization and interest on the capital assets it had contributed to the Pool and also its share of the Pool profits.

<sup>2</sup> In May 1940 the Petroleum Board became a limited company so that it could enter into contracts.

<sup>3</sup> The Lubricating Oil Pool was managed by a committee composed of one representative each from the Anglo-American Oil Company, Lubricating and Fuel Oils, the Vacuum Oil Company, Lobitos Oilfields, and the British Alliance Oil Corporation, representing the smaller firms. Mr. A. L. (later Sir Alexander) McColl, of the Vacuum Oil Company, was the Chairman, and the Pool's representative on the management committee of the main Pool. A representative of C. C. Wakefield and Company, also sat on the Board but took no part in its proceedings. His presence was an anomaly since, as a non-importing firm, Wakefields were not a member of the Lubricating Oil Pool. But they had been one of the companies originally involved in preparing the Pool organisation before the war when it was thought that blending firms would be included within it.

and transport organisation were carried out within the framework of Government policy. The Petroleum Department was also the intermediary through which the economic implications of petroleum supply—a demand for scarce foreign currency for instance, or for scarce materials to provide extra facilities—were related to the economic war effort of the country as a whole. In addition the Petroleum Department was the agent through which decisions about the level to which civilian oil consumption should be held were made effective. The actual supply of oil fuel to merchant ships and to commercial motor vehicles was controlled through two other departments, the Ministry of Shipping and the Ministry of Transport respectively.

In organising the shipping and transport of oil, Shell-Mex House came into contact with two other branches of war government—the Port and Transit Control and the Shipping Control. Port and Transit Control, working under the Ministry of Transport, consisted of a central 'Diversion Room', and a Port and Transit Standing Committee; the Diversion Room determined the port to which incoming cargo ships should be directed, and the Standing Committee supervised Port Emergency Committees established at each port to ensure that ships, and their cargoes, were handled expeditiously. However, because oil traffic used specialised facilities, the oil control worked in large measure independently of this machinery. Shell-Mex House chose the ports at which tankers discharged, subject of course, to an Admiralty veto, expressed through the Petroleum Department which sent a representative to the Diversion Room. The Petroleum Department also had a representative on the Port and Transit Standing Committee and the Department's Port Petroleum Officers sat on the Port Emergency Committees at each port, side by side with representatives of the port authorities, of other port users, and of the inland transport and shipping controls. But in practice the Port Petroleum Officer was always a manager of one of the oil installations at the port and worked direct to Shell-Mex House. His link with the Petroleum Department gave him an official status that enabled him to deal on equal terms with representatives of other Government departments. He spoke for the petroleum interest when the Port Emergency Committee was settling allocation of common facilities such as tugs or locomotives.

Unlike the Port and Transit Control, the Shipping Control played an integral part in the movement of petroleum. Three days after the outbreak of war an Order issued under the Defence Regulations, the Control of Trades by Sea Order,<sup>1</sup> prohibited all British merchant

<sup>1</sup> Control of Trades by Sea Order, 1939 (S.R. & O. 1939, No. 1090) and Control of Trades by Sea (No. 2) Order 1939 (S.R. & O. 1939, No. 1671).

ships of over 100 gross tons, except fishing vessels, from putting to sea without a licence from the Minister of Shipping. The Ministry's Sea Transport Department exercised this control over tankers through a Tanker Licensing Committee, composed of representatives of the Ministry, managers of the principal tanker companies and a Petroleum Department representative. The Tanker Licensing Committee met daily in the early stages of the war, and later twice a week, to allow or 'disallow' voyages which the Tanker Tonnage Committee at Shell-Mex House suggested for British-flag tankers—or foreign tankers which the Ministry of Shipping had taken on time-charter.

In the opening months of the war the Ministry of Shipping co-operated with the Petroleum Department and the Admiralty through the governmental Tanker Tonnage Committee. The duty of this committee of officials, which met under the Civil Lord of the Admiralty, was to review the shipping implications of oil import programmes and factors affecting the supply of tankers. It held its first war meeting on 18th September 1939.

At the apex of the whole system stood not, as originally intended, the Oil Board—with its essentially supervisory function of reviewing 'from time to time' the actions of Departments—but what looked like a much more dynamic body—the Oil Control Board. This was set up by the Prime Minister in November 1939, with the status of a sub-committee of the War Cabinet, to 'take the necessary action to conserve and maintain adequate supplies of petroleum products, including the provision of tanker tonnage'; and also—a role cast, as has been shown, with the experience of the previous war very much in mind—to 'decide, subject to the right of final appeal by any Department to the War Cabinet, priority claims for oil products and tanker tonnage'. The Oil Control Board was a mixed body of civilians and Service officers, sitting under the chairmanship of the Secretary for Mines, Mr. Geoffrey Lloyd. It included two other junior Ministers, the Civil Lord of the Admiralty and the Parliamentary Secretary to the Minister of Shipping,<sup>1</sup> thus bringing together at ministerial level all the departments concerned with oil supply and shipment. Consumer interests were represented by the chief supply officers of the three Services (the Fourth Sea Lord, the Quartermaster-General and the Air Member for Supply and Organisation) and a senior official from the Petroleum Department. Down to the spring of 1942 a former Ambassador, Sir Ronald Graham, sat as a member to assist on questions affecting relations with other countries. Lord Cadman, Chairman of the Anglo-Iranian Oil Company, who had been appointed expert adviser to

<sup>1</sup> In 1942 the Parliamentary Secretary to the Ministry of War Transport, as it had then become, ceased to attend regularly, and the permanent head of that Ministry joined the Board.

the Secretary for Petroleum on the outbreak of war, was also a member until he died in mid-1941.

From the Oil Control Board's terms of reference it appears that the Prime Minister intended to create an executive organ with a strong initiative in policy-making. In practice the members of the Board had neither the time nor the detailed knowledge to enable it to function in this way. From the first the Oil Control Board was simply an adjudicating and supervisory body—in fact exactly what the Oil Board had been intended to be in war-time. But even in this more limited role its interventions became less and less frequent. During the first two and a half years of the war it met, on average, about once a month; later it averaged only one meeting in two months, and by 1945 the Oil Control Board was almost in abeyance. Inevitably as time went on, it delegated much of its work to sub-committees, composed of more specialised departmental officials; at the same time the growing intimacy of working contacts between departments made co-ordination by committee less and less necessary.

Nevertheless the role of the Oil Control Board should not be judged by its declining years. In November 1939 a deliberate decision was taken that major questions affecting oil supply were to be determined by a composite, but predominantly civilian, body senior enough to command the respect of the Service departments. The relationship established, under the auspices of the Oil Control Board, between officials and Service Chiefs was reflected in a frank and full exchange of information about stocks, imports and consumption embodied in weekly statistics published by the Board. The value of this rapport is underlined by the contrasting experience of both of Britain's principal war-time Allies in the handling of their oil affairs.<sup>1</sup>

(ii)

### The Task

The Government had put together an administrative machine for the task of meeting war-time oil demands. It is now time to consider the dimensions of that task. How close were the pre-war forecasts of consumption for the first twelve months of a war with Germany to the actual rate of consumption while France and Britain were still in the war together? The table overleaf gives comparative figures.

<sup>1</sup> See below pp. 120, 251–252 and 364.

TABLE 3

United Kingdom Oil Consumption 1939-40 (weekly average)

	000 tons						
	Total consumption	Armed Forces consumption			Civil consumption		
		All products*	Admiralty oil fuel	Aviation spirit	Motor spirit	Bunkers‡	Motor spirit
1938	196·4	7·6	2·3†	0·5	27·4	100·8	57·8
Oil Board's estimate	303·3	124·0	11·4	9·9	29·3	69·7	59·0
September 1939-May 1940	211·7	58·9	5·0†	3·1	21·5	58·1	65·1

\* Excludes bitumen.

† Includes small civilian consumption of aviation spirit.

‡ Includes bunker oil supplied by the Petroleum Board to Admiralty minesweepers.

§ Includes consumption by the Armed Forces of paraffin, derv oil, sundry Services factory consumption and lubricating oil.

The table shows that, excluding naval bunkers, weekly average consumption after the outbreak of war was not only less than the Oil Board had predicted, but substantially less than in 1938.

The biggest discrepancy was in consumption by the Armed Forces. Over the first nine months as a whole, the Army and the Royal Air Force used less than one-third as much petrol and less than half as much aviation spirit as had been expected in the first year of a war against Germany; this includes consumption on the Continent as well as in Britain. The main reason why consumption was low was, of course, the absence of heavy fighting during much of this period. In the brief periods when these two Services were heavily engaged, rates of consumption by both Services proved much closer to forecast. Thus, during the first four weeks of heavy fighting in France and Belgium, the Army consumed just over 9,000 tons of petrol a week, about 300 tons more than the pre-war estimate; and at the height of the Battle of Britain, in August and September 1940, the Royal Air Force used about 10,700 tons of aviation petrol a week as against 11,100 in the Oil Board estimates.<sup>1</sup>

However, as the table above shows, there was a startling disparity between the Royal Navy's pre-war estimate and its actual rate of consumption in the first nine months. The impression this makes is

reinforced by the fact that when, in the autumn of 1939, the Admiralty estimated their oil requirements from United Kingdom stations for the twelve months beginning December 1939, they arrived at a figure of only 63,000 tons a week. Even this was considerably more than the 50,000 tons a week actually used over the first nine months; and that 50,000 tons was itself to prove appreciably higher than the rate of consumption over the next nine, for it reflected an unusually high rate of demand (roughly 80,000 tons a week) during operations off Norway in the spring of 1940.

The discrepancy seems the more remarkable in that the Navy's consumption should have been less affected than that of the other two Services by the unexpected course of the war because its main duties were patrol and convoy work. It may be that the requirement figures given in the pre-war forecast are not strictly comparable with the war-time figures. There are indications that pre-war figures may have allowed for stock losses from air raids and for some needs of French warships. In addition the pre-war figure for 'United Kingdom requirements' may cover bunkering at stations throughout the Atlantic area; though it is relevant to remark that British naval offtake of oil fuel, not only in the Atlantic but throughout the world, was less than 80,000 tons a week during the first nine months of war.

This apparently large over-estimate of naval requirements before the war has been stressed because of its effect on the shipping calculations. Had the Admiralty's demands been nearer reality there would have been no need to provide for a 'tanker deficit' even in the worst conceivable contingency of a closed Mediterranean and an 'unfriendly' United States. There would have been no incentive to start on the ineffective hunt for second-hand tankers.

In contrast to the forecasts by the Services, pre-war civil estimates are shown to have been reasonably close to the mark. Too much should not be made of this observation. For one thing these forecasts were related to circumstances that were more controllable. In the second place the closeness of the two figures conceals bigger variations in the items which make them up. The pre-war supply plans had assumed that consumption of all oil products, other than lubricating oil, would be curtailed. In fact many products were distributed in larger quantities than in time of peace. More paraffin was used, for instance, than the Oil Board had allowed for, and more even than in 1938. As expected, the demand for vaporising oil rose steeply under impetus of the drive for home-grown food. However—and this had not been expected—consumption of burning oil rose too. Shell-Mex House does not appear to have taken steps to restrict supplies to the market; and demand was above normal in the winter of 1939-40, partly because of unusually cold weather, and partly because of the new needs of people evacuated from towns to rural

<sup>1</sup> The Oil Board estimates given in Table 3 differ from these figures, since they cover consumption of petrol and aviation spirit by all three Services.

areas where there were no supplies of gas or electricity. Deliveries of heavy oils for industrial use were also higher than in peace-time.

On the other hand the offtake of commercial bunkers from United Kingdom ports, which had been expected to go up, went down considerably after war broke out. Under instructions from the Bunker Policy Committee the Ministry of Shipping sent a letter to all British shipowners in September 1939 asking them to bunker their ships abroad as much as possible. Later, in March 1940, the shipowners were asked to ensure that their vessels arrived at United Kingdom ports with as much bunker oil as they could carry, short of shutting out cargo; and customs officers were instructed to allow ships only to take on enough fuel oil in Britain to reach the nearest bunkering port overseas. The Ministry of Shipping also sought to encourage a greater use of coal. As was mentioned earlier, about half the British oil-fired steamers were equipped to burn coal as an alternative, and indeed some habitually used coal on outward voyages and oil for inward ones. On 20th March 1940 all owners of dual-fired ships were asked to adopt this practice.

Petrol consumption also fell more than expected. The Oil Board had assumed that petrol consumption would have reached about 104,000 tons a week by 1940 under natural market forces; and they had planned to cut it back to just under 70,000 tons a week. In fact, although supply restriction did not begin until three weeks after the outbreak of war, consumption over the first nine months averaged under 63,000 tons a week; and this included military consumption of the order of 6,000 tons a week. The authorities had prudently assumed that everyone who drove a car or motor cycle before war broke out would continue to do so afterwards; and that, projecting the normal rate of increase, there would be 10 per cent. more vehicles on the roads in 1940 than in 1938. In fact, war broke out in 1939, by which time the number of cars licensed under the Roads Act had risen by less than 5 per cent., and the number of motor cycles had actually fallen. In addition once petrol supplies were restricted, many car owners decided that it was not worth relicensing their vehicles, especially since the duty was raised after the war started. By the end of May 1940 there were 550,000 fewer private cars and 139,000 fewer motor cycles licensed for the road than nine months earlier.

It was because the number of motorists in 1940 was fewer than allowed for in the pre-war projections that petrol consumption fell so much more than expected. Allowing for this factor the reduction achieved was more or less in line with what had been planned. This saving was brought about without dislocation of the national economy or undue hardship. For this accomplishment credit must be given to the arrangements for petrol rationing, which will now be examined.

(iii)

## Motor Fuel Rationing

The Government took power to control the allocation of motor fuel on the day war broke out. However, for administrative reasons, it did not begin using that power until 23rd September. A Motor Fuel Rationing Order<sup>1</sup> forbade dealers in motor fuel and their customers to 'furnish or acquire' petrol or derv fuel except against the surrender of coupons, valid for the period of the transaction and for the vehicle concerned. It forbade the use of motor fuel acquired against coupons for any purpose other than that authorised by the coupons. Dealers were compelled to keep and produce such records as the Board of Trade might 'reasonably require'. To prevent a run on supplies before rationing came into force the Order also forbade dealers to sell motor fuel to their customers unless they were 'reasonably satisfied' that it was wanted for immediate use, i.e. not for hoarding. The Motor Fuel Rationing Order was followed by another, the Petroleum (No. 1) Order, of 12th October 1939,<sup>2</sup> which sought to block a loophole exploited in the First World War by preventing the use of paraffin, white spirit,<sup>3</sup> or other 'special boiling point spirits' as fuel for vehicles, or the mixing of these products with petrol for use as motor fuel. Petroleum Order (No. 1) also compelled wholesalers of these products to keep and produce records; and permitted vehicles and premises to be inspected on suspicion.

Such was the framework of legal compulsion within which the rationing scheme operated. The principles of that scheme have already been outlined.<sup>4</sup> A basic ration, giving roughly 1,800 miles of motoring a year, was granted on application at main post offices or local taxation offices to owners of registered motor vehicles on production of the vehicle's log book. Applicants were each given a book of coupons, authorising the purchase of a specified number of

<sup>1</sup> Motor Fuel Rationing Order, 1939, (S.R. & O. 1939 No. 1055) amended by Motor Fuel Rationing (No. 2) Order, 1939 (S.R. & O. 1939 No. 1271). Petrol and derv fuel were defined in the Order by their distillation ranges. Dealers (defined as retailers of petrol or derv fuel) were allowed a margin of 1 per cent. (extended by Motor Fuel Rationing Order 1940 (S.R. & O. 1940 No. 666) of April 1940, to 2 per cent.) between the total of coupon values they had to deliver up to secure further supplies and the amount of replenishments they received.

<sup>2</sup> S.R. & O. 1939 No. 1420. Specifically the prohibited hydrocarbon oils were those with a 'closed flash point . . . of 73° F. or over and not higher than 150° F. either alone or admixed in any proportion with any other hydrocarbon oils'.

<sup>3</sup> A product intermediate between petrol and paraffin used as a paint thinner (in place of turpentine) and for dry cleaning.

<sup>4</sup> See p. 50 *et seq.*

'units' of motor fuel<sup>1</sup> within a specified month. Basic ration books were also issued for all hire cars (self-driven and chauffeur-driven). Taxicabs<sup>2</sup> were entitled to a ration which, unlike the private car 'basic', was not related to their horsepower; London taxis (which were all about the same size and were thought to use about 120 gallons a month) were given coupons worth 90 gallons a month by the Public Carriage Office of Scotland Yard. Taxis in the provinces received a ration of 20 gallons a month from the local taxation offices.

These were automatic allocations. There were also discretionary issues. These were issued from twelve Regional Petroleum Offices<sup>3</sup> and two sub-offices<sup>4</sup> which came into operation at the outbreak of war.<sup>5</sup> They were granted, as a supplement to the 'basic', to applicants who could show they had special needs; and they were granted strictly for specific named purposes. For purposes classified as 'semi-essential', (broadly speaking, purposes essential to the individual concerned but not to the community in general), the Regional Petroleum Offices could grant extra allowances at discretion to give, together with the 'basic', up to roughly 4,800 miles of motoring a year; for 'essential' purposes they could give coupons for up to a maximum of 9,000 miles of travel a year.<sup>6</sup> Hire cars could also draw supplementaries, granted at first, on the semi-essential scale; in mid-October 1939, however, hire car supplementary allowances were increased to a maximum of between five and six times the basic ration. London taxis received no supplementaries; but those in the provinces could receive from between 23 and 70 gallons a month extra depending on horsepower.

Allowances to supplement the 'basic' were not the only discretionary issues. The Regional Petroleum Offices also granted

<sup>1</sup> The 'unit' system was adopted to enable the value of coupons to be varied up or down as the supply situation demanded. The value of a 'unit' was normally one gallon of petrol or two-thirds of a gallon of derv oil.

<sup>2</sup> Vehicles licensed as 'hackney carriages' and also licensed to ply for hire, whether they carried taximeters or not.

<sup>3</sup> At first these were called Divisional Petroleum Offices. When, in 1942, the Petroleum Department was absorbed into the newly-formed Ministry of Fuel and Power the title of Divisional Petroleum Officer was changed to Regional Petroleum Officer. For convenience the term Regional is used throughout.

<sup>4</sup> The Regions were: Northern; North Eastern; North Midland; Eastern; London; Southern; South Western; Welsh; Midland; North Western; Scottish; South Eastern. There were sub-offices in North Wales and South-West Scotland. There was a fifteenth Regional Petroleum Office in Northern Ireland which was responsible for issuing all discretionary coupons including those to commercial transport. The reason for this difference was that in Northern Ireland public haulage was virtually a monopoly of the Northern Ireland Road Transport Board. Thus the question there was only one of fuel economy and not of controlling the activities of transport operators.

<sup>5</sup> Members of Parliament, who were rationed on the same principles as other private car users, but obtained their coupons from the Fees Office of the House of Commons which received a block allocation from the Petroleum Department.

<sup>6</sup> In fact at the outset of rationing the basic ration gave 12 h.p. cars only 1,944 miles of travel a year; on maximum 'semi-essential' plus 'basic' 5,508; on normal 'essential' maximum plus 'basic' 8,100. For 20 h.p. cars the figures were 2,040, 5,916 and 8,568. The difference was due to rounding off each normal ration to the nearest gallon.

allowances at discretion to many motor fuel users who received no automatic allocation. These included 'industrial users' embracing engine manufacturers,<sup>1</sup> users of stationary engines and of self-propelled engineering plant such as trench diggers, cranes, etc., owners of vehicles running under trade licences, ambulances, motor boats, motor mowers, and travelling showmen using their vehicles as stationary engines, users of motor fuel for general workshop purposes, and people running private electric lighting plants on motor fuel. Discretionary issues were also made to 'agricultural users' for stationary engines and machines working on the land, such as tractors and combine harvesters; and also for vans and lorries used in connection with farming. The farmers were not brought under rationing right from the beginning. Because of the great pressure on the Regional Petroleum Offices in the early weeks of the war, and the importance of ensuring that farming operations were not hampered during the harvest and ploughing season, motor fuel for machines used in farming was obtainable under open general licence until the 1st January 1940.

A third class of user was Government departments, (such as the Post Office) using vehicles for official purposes. These users received a block allocation of coupons direct from the Petroleum Department.<sup>2</sup>

So much for the non-commercial users. It remains to describe how supplies of petrol and derv oil were distributed to the operators of goods and passenger-carrying vehicles. The supply of goods vehicles was organised through a system designed primarily to give the Ministry of Transport some control over their movements. For the purpose of the rationing scheme, goods vehicle operators formed themselves into 'groups' of from 25 to 100 vehicles under the control of a 'group organiser', chosen from among themselves. The group organisers were supervised by Sub-District Managers, also nominated by the transport operators, and approved by the Ministry's Regional Transport Commissioner. Above the Managers were District Transport Officers who were officials of the Ministry; and at the head of the whole regional transport system was the Regional Transport Commissioner. Like private motorists, the road transport operators received a basic allowance of fuel, the coupons being issued by the Sub-District Managers to the group organisers. This allowance was based, not on horsepower, but on 'unladen weight' at a rate of three 'units' per half ton, giving approximately 170 miles of travel a

<sup>1</sup> Regional Petroleum Offices also granted coupons for aviation spirit to aircraft engine manufacturers.

<sup>2</sup> Their use was restricted to official journeys for vehicles (such as mail vans) owned by the Government or by officials making journeys in their own cars for which mileage allowance was payable. The Foreign Office received a block allocation for distribution to the foreign diplomatic corps in accordance with a scale agreed with the Petroleum Department.

week.<sup>1</sup> Contrary to what might have been expected, it was not tied strictly to transport purposes but could be used, like the private car 'basic', for recreation. The Sub-District Managers could also issue supplementary coupons at their discretion up to a sixth of the basic allowance. A further sixth could be issued at the discretion of the District Transport Officer; and yet another sixth by the Regional Transport Commissioner. This meant that total discretionary issues should have never exceeded 50 per cent. of the basic issue. Yet in the early months of the war they often did so.

Bus and coach operators were easier to control than road hauliers because they were fewer and their operations were more stereotyped. In fact, they were controlled more stringently, receiving their coupons directly from the Regional Transport Office. The coupons covered what was called a 'basic ration', which was equal to half their consumption during the corresponding period of 1938. Bus and coach operators, however, could not use this 'basic' as they wished but only for running services that had been authorised.<sup>2</sup>

There was no thought of rationing motor fuel in a ruthless way during the opening months of the war. The maximum of 9,000 miles a year of motoring for essential purposes, for instance, was not very strictly adhered to. If the purposes were essential naturally fuel to meet them could hardly be withheld. In fact the maximum had only been laid down to give Regional Petroleum Offices a standard to judge by, and thus avoid waste. Shortly after rationing began the Regional Petroleum Offices were authorised to meet in full the 'reasonable' requirements of doctors, veterinary surgeons, officials of firms engaged on Government contracts, farmers etc. (and also disabled people who depended on mechanical transport and who were included in the essential class after war broke out). Some users received allowances exceeding twice the maximum. It should be noted that essential users could receive allowances, limited to a monthly maximum, to cover business as well as 'residential' journeys (that is journeys between home and place of work, or between home and railway station);<sup>3</sup> but it remained a cardinal principle that supplementary coupons should never be issued for journeys for which alternative means of transport could be used.

Semi-essential consumers were much more strictly treated. Many suffered severely. Small businesses were hampered and even forced to close down by petrol rationing. The national economy had to be reorganised for war, and Regional Petroleum Officers were strictly

<sup>1</sup> But substantially less in the case of the lighter vehicles with an unladen weight of up to 30 cwt.

<sup>2</sup> For an account of the Emergency Road Transport Organisation, see C. I. Savage, *Inland Transport* (H.M.S.O. 1957), Ch. II.

<sup>3</sup> Semi-essential users could also receive allowances for 'residential' travel within the limits of their maximum.

enjoined to take no account whatever of the effect which refusal to grant an extra allowance might have on an applicant's peace-time livelihood. They were absolutely forbidden to exceed the maximum for the semi-essential class except on compassionate grounds. One group of semi-essential consumers did however win a notable concession before the war was many weeks old. At the end of 1939 commercial travellers were permitted to receive allowances up to 50 per cent. in excess of the normal maximum of the class.<sup>1</sup>

The primary function of rationing is to distribute limited supplies between members of the community in the way which serves the community best. But fairness between individual and individual is also a necessary ingredient of it, and the appearance of fairness is a condition of success. How did the motor fuel scheme stand up against this criterion?

The authorities well understood the importance of winning the goodwill of the general public. The Secretary for Petroleum himself stressed the need to tread carefully: 'I would like the petrol rationing organisation,' he wrote in a departmental minute in January 1940, 'not merely to avoid the stigma of rudeness, the haughtiness of petty officialdom etc., but to gain a positive reputation for courtesy and consideration in their dealings with the public.'

Yet there were still many complaints. Most of these in the early stages were about the time taken to deal with applications. It was disagreeable to be kept in uncertainty, and any delay seemed inexcusably long to the impatient businessman whose livelihood could be threatened by an unfavourable response. Such delays remained unavoidable at the beginning. The Regional Petroleum Offices were inexperienced. To sort out thousands of almost simultaneous applications for supplementary issues, to assess their merits, and to attach coupons to those that successfully made out a case, and to despatch them to applicants was a considerable task for their small clerical staffs. The Petroleum Department strove to assist with guidance on official procedure. In December 1939, the Department appointed an Inspecting Officer to tour the regions and give advice; later a small unit was set up, and its members systematically visited Regional Petroleum Offices introducing standard methods of organisation. The clerical burden was lightened by extending the initial two-monthly rationing period to three months, then to four months (except to agricultural and industrial consumers) and finally to six months for all applicants; and also by issuing coupons to the various classes of consumers at different times.

<sup>1</sup> This applied to commercial travellers working for firms which employed less than ten cars. Larger firms were encouraged to 'rationalise' the use of their cars by being permitted, on application to the Regional Petroleum Office, to concentrate on particular vehicles the petrol allocated for their whole fleet.

As the Regional Petroleum Officers got into their stride grievances concerning delay diminished but other and more serious complaints made their appearance. There were charges of unfair discrimination, of gross disparities in the allowances granted to persons in similar circumstances. On examination such complaints often proved justified. There were bound to be inconsistencies in the decisions of fifteen separate regional offices appraising a multitude of particular cases. The Petroleum Department sought a remedy in the pooling of experience and in the gradual building up of a body of 'case law'. The Department collected and analysed the working experience of the regions and circulated its conclusions in a series of 'Instructions'. By the end of 1939 no less than two hundred of these 'Instructions' had already been circulated. They indicated the allowances which would be appropriate to such special types of applicant as 'Poppy Day' workers and Animal Welfare Societies. In arriving at these assessments the rationing authorities were helped by advice from liaison officers appointed from such bodies as the British Medical Association, the Trade Unions, Newspaper Proprietors and Distributors, Public Utility Undertakings, the motoring organisations, the National Farmers' Union etc.<sup>1</sup> Meanwhile individual grievances were carefully checked by the Petroleum Department, which acted as a court of appeal from the Regional Petroleum Offices. Whenever discovered, manifestly unjust discrepancies in allowances were removed.

However, the fact that inequities were shown to exist tended to reduce the esteem in which the Regional Petroleum Officers and their staffs were held. No administrators rationing other commodities were quite so intimately dependent on their reputation with the public. For the staff of the Regional Petroleum Offices had to perform the invidious task of individual assessment through direct dealings with those on whose claims they were called upon to adjudicate; and applicants knew that the responsibility for discrimination was theirs. Reflecting on this situation after the end of the war, the official who drew up the petrol rationing scheme came to the conclusion that uniformity of treatment would have been easier to achieve if car users below the essential class had been divided into groups based on occupations, each with its appropriate scale of allowances up to a maximum.

Quite apart from administrative difficulties with motor fuel rationing, there were some integral features of the scheme whose justice was open to question. For one thing 'supplementaries' were assessed in complete disregard of pre-war consumption. The man

<sup>1</sup> The Service Departments and various other Ministries such as Supply, Aircraft Production, Agriculture and Fisheries etc. appointed liaison officers to advise Regional Petroleum Officers in difficult cases affecting the activities of their Departments.

who had formerly driven 10,000 miles a year, and the man who had averaged 30,000, were treated almost alike. This could mean great inequality in the degree of hardship imposed. Moreover the scheme seemed to discriminate in favour of those who used their vehicles for amenity only—in other words, those who were entitled to draw merely the basic ration. Car owners in the semi-essential class generally had to use all their 'basic' for business purposes; and this despite the fact that (save in rare borderline cases) they were assessed for supplementary issues as if they had received no basic ration at all. They found themselves straitened in this way because of the rather low maximum fixed for semi-essential supplementaries. Since they had no fuel for pleasure motoring themselves they were, not surprisingly, critical of a system which gave it for this purpose to others. They argued that petrol which they needed for their livelihood was denied them in order to be given to those who had no real need of it. Goods vehicle operators took much the same view.

Hard-hit business users were not the only critics of the private basic ration. By the end of May 1940 a strong body of opinion within the Government—and influential circles outside it—had begun to feel that motorists in Britain were on far too loose a rein. A memorandum from the Chairman of the Economic Policy Committee,<sup>1</sup> Mr. Arthur Greenwood, spoke of the 'common observation' that there was a vast amount of unnecessary motoring. Mr. Greenwood went on to advocate that all luxury and pleasure motoring should be ended, and with it the basic ration.<sup>2</sup>

Had it accepted this suggestion the Petroleum Department would only have been carrying out its original intention. The device of a basic ration had been introduced into the motor fuel rationing scheme after Munich to enable the Regional Petroleum Offices to keep vehicles moving through the opening weeks of the war—during the period when those users who required petrol for essential purposes were to be identified and their true requirements worked out. Once this had been done it was intended that all issues should become discretionary and tied to specific uses. This plan would have done away with the whole concept of a 'pleasure' ration, or basic personal allowance which could be used entirely as the motorist wished.

Nevertheless, in 1940, the Petroleum Department came down in favour of leaving the basic ration untouched, arguing that to abolish it would cause 'serious hardship' to people in rural areas.

<sup>1</sup> The Economic Policy Committee was set up in the autumn of 1939; it was a Ministerial body to review and co-ordinate departments activities in relation to the economic effort of the country. It was abolished at the end of 1940 when its functions were transferred to the Lord President's Committee. See W. K. Hancock and M. M. Gowing, *op. cit.*, Ch. III.

<sup>2</sup> There were letters from two M.Ps. to the Petroleum Department in May 1940.



The Department reasoned that 'at the present time when a large proportion of the public are overworking themselves in the national cause, to deny them the small amount of enjoyment which the "basic" ration . . . provides would be a severe privation and might militate against their health and efficiency'. The fact was that the Department did not believe that it was the 'basic' that was causing all the waste. It thought that motorists who drew only the basic ration would not have enough fuel to indulge in the kind of conspicuous pleasure motoring that was arousing public comment. Indeed the Department was convinced that many people were using their basic ration for purposes for which they could have successfully applied for a supplementary allowance. Most of the conspicuous consumption, the Department believed, was coming from the misuse of supplementary rations, and it concentrated the attack on these rations. It sought to tighten the enforcement of the regulations. On 28th May 1940 a more stringent version of the Motor Fuel Order was published specifically prohibiting the transfer of coupons or their use for any purpose other than that for which they were issued.<sup>1</sup> This was followed later by a direct appeal to the public for economy delivered over the radio by the Secretary for Petroleum.

The Petroleum Department was almost certainly correct in its reasoning. But it disregarded the main accusation that could be levelled against the 'basic': namely that the existence of a petrol allowance which could, with full legality, be used for any kind of motoring, made it extremely difficult to catch motorists who misused their supplementaries, or to prove a case against them. At the same time a basic allowance weakened inhibitions against the use of the supplementaries for unauthorised purposes, a misuse which could easily be regarded as a mere technical breach of the regulations. It also blunted the edge of all appeals for economy, for the concept of 'free motoring' spread to commercial transport operators who regarded their own basic ration as a personal allowance like that of the private motorist. This view was actually accepted by the Ministry of Transport which seems to have felt that it could not, in justice, curtail or abolish the goods vehicle 'basic' while the private 'basic' was maintained. Yet the whole purpose of controlling fuel allocations to commercial transport had been to bring the road transport industry under control. To make that control effective this large automatic allowance—equal to 50 per cent. of the operator's 1938 consumption—needed to be abolished at the earliest moment that was administratively feasible.

Nevertheless, the Economic Policy Committee accepted the Petroleum Department's advice and the 'basic' was retained. In

retrospect this looks like a mistaken decision. Psychologically it would have been relatively easy to have abolished all the automatic allowances in the summer of 1940, when defeat and the threat of invasion would have ensured a favourable response from the public. It would have been wise to abolish it then if only because the longer the decision was postponed the harder it became to take. Abolition would inevitably create extra work for the Regional Petroleum Offices in assessing discretionary allowances for a variety of domestic purposes for which motorists had formerly used their 'basic'. This task they became increasingly reluctant to face as the war went on and clerical labour became harder to get and lower in quality.

But retrospective appraisals of this kind overlook the atmosphere and pressures of that period. In the summer of 1940 there was a high level of stocks and good supply prospects. The Petroleum Department was not inclined to seek austerity for austerity's sake. And they were certainly influenced by the very impressive degree of saving in motor fuel consumption that had already been achieved under the existing rationing pattern.

(iv)

### The Bragg Committees

During the first nine months of the war the saving of imports through petrol rationing was equal to more than two-thirds of the extra consumption imposed by war demands from the Services.<sup>1</sup> But restricting civil consumption was not the only way by which the Government sought to alleviate pressure on tanker space. An integral part of Government economy plans had been the substitution of home-produced fuels for imported petroleum.

For a number of years before the war public attention had been focussed on the possibilities of making oil from coal. In 1937 the Falmouth Committee<sup>2</sup> had come down heavily against this possibility as a feasible substitute for imported oil supplies in war-time. It had argued that the construction of 'oil from coal' plants on a big scale would be economically impracticable and strategically undesirable. However, public interest in the subject persisted and Mr. Geoffrey Lloyd, then Secretary for Mines, felt that no possibility for economising in the use of imported fuel should be neglected. In November

<sup>1</sup> Petrol consumption was 31,000 tons a week below the 1938 level; total oil consumption by the Services in Britain and on the Continent was 50,000 tons a week higher than in 1938.

<sup>2</sup> Cmd. 5665, Sub-Committee on Oil from Coal, Report.

<sup>1</sup> Motor Fuel Rationing (No. 2) Order, 1940 (S.R. & O. 1940 No. 826).

1939 he appointed a small committee under Sir William Bragg, President of the Royal Society, to 'consider and review in the light of war conditions the scope for the substitution of imported fuels by home-produced fuels and to recommend what detailed enquiries should be undertaken with a view to securing the best use of home-produced fuels in war-time'.<sup>1</sup>

The Bragg Committee met in the middle of December 1939 and set on foot a series of systematic enquiries. Early in 1940 no less than five committees began meeting to consider different sources of petroleum substitutes, and another committee under Sir Clement Hindley began considering how to improve efficiency in the use of all fuels.<sup>2</sup> But their reports, which all came out between April and August 1940, were only mildly encouraging. One committee chaired by Lord Henley,<sup>3</sup> which looked at prospects for low temperature carbonisation, reported that this small British industry could not hope to raise its oil output by more than 7,000 tons a year. Its most useful product would be its coke, from which producer gas could be made for use as a tractive fuel for motor vehicles. A second committee, under Mr. Irvine Geddes,<sup>4</sup> considered colloidal fuel (a half-and-half mixture of oil and coal in which coal is 'suspended' in the oil) and a third committee, under Sir William Jowitt,<sup>5</sup> looked at the Fischer-Tropsch and other synthetic 'oil from coal' processes. Both the Geddes and Jowitt Committees saw a future for these processes in Britain; but not until the war was over. The Geddes Committee, recalling the experience of the Powell Duffryn Association Collieries in South Wales, which had made pre-war tests of oil-coal mixtures as a furnace fuel in ships, thought that it might be worth erecting a pilot plant to gain further information. The Jowitt Committee had before it the operating experience of a commercially operating Fischer-Tropsch plant in France which had been built to the design of the German owners of the patents, Ruhr-chemie.<sup>6</sup> Like the Falmouth Committee, the Jowitt Committee was greatly impressed with the potential value of this process to a country with a vast coal surplus. It too recommended the construction of a pilot plant. But even pilot plants could not be built amid war-time shortages of steel and labour. The outcome of it all was that the only 'oil from coal' plant to operate in Britain during the war years remained the hydrogenation plant which Imperial Chemical

<sup>1</sup> Committee on the Development of Home-produced Fuels in War-time.

<sup>2</sup> Committee on the Efficient Use of Fuel.

<sup>3</sup> Committee on Low Temperature Carbonisation.

<sup>4</sup> Committee on Colloidal Fuel.

<sup>5</sup> Committee on Fischer-Tropsch and similar Synthetic Processes.

<sup>6</sup> A company called Synthetic Oils Ltd. had conducted experiments in Britain with a different process, the Robinson-Bindley process, which employed water gas as a 'synthesis gas'.

Industries Ltd. had built at Billingham.<sup>1</sup> But during the war this plant did not in fact hydrogenate coal. For both financial and technical reasons it had been turning increasingly to the hydrogenation of creosote oil instead of coal,<sup>2</sup> and it confined itself to creosote after the outbreak of war. Since this creosote might otherwise have been used as a fuel oil, Billingham made no contribution to saving tanker space. The value of its operations lay in the high quality of petrol produced by the hydrogenation process. Later, Billingham was to play a vital part in the manufacture of 100-octane aviation spirit.

Of the various 'oil from coal' processes there remained then, only high temperature carbonisation. The potentialities of this process were considered by a committee which sat, first under Mr. J. Davidson Pratt, and then under Mr. W. Gordon Adam.<sup>3</sup> About 40 million tons of coal a year were being carbonised by the British gas and metallurgical coke industries, yielding about 2 million tons of coal tar. This 'crude tar' was refined at tar distilleries to produce 'road tar', creosote, pitch, and a small quantity of crude benzole as well as such important chemicals as phenol, anthracene and naphthalene. About 350,000 tons a year of crude benzole were also 'stripped' from the coal gas which both industries manufactured (the gas industry as its main product, and the coke industry as a by-product). Benzole was the source of toluene required for the manufacture of explosives; and refined, it also made an excellent motor spirit. Creosote could be burned under boilers and furnaces as a substitute for petroleum fuel oil. Refined tar was an alternative to bitumen, the name given in Britain to the heavy residual hydrocarbons which are left after the distillation of crude oil has been carried to its furthest point, and which is solid at the temperature of the atmosphere. Both products were used for road surfacing and also for water-proofing and electrical insulation.

There was little chance of increasing the output of crude tar and its refined products. Output was determined entirely by the demands for town's gas and metallurgical coke, which were themselves determined by the level of industrial activity and the pattern of domestic fuel consumption. It was physically impossible to make gas and coke in excess of the demand for them as a means of increasing the output of 'tar oils', since the filling up of storage space would soon have brought operations to a standstill; in fact the output of high temperature coal tar remained at about 2 million tons a year annually throughout the war.

<sup>1</sup> In 1939 Germany was producing 750,000 tons of oil a year by the Fischer-Tropsch process. See C. C. Hall: 'Operation and Development of Fischer-Tropsch and Similar Processes in Germany', *Journal of the Institute of Fuel*, February 1947.

<sup>2</sup> See K. Gordon, *Progress in the Hydrogenation of Coal and Tar*, a paper presented to the Institute of Fuel, 9th December 1946.

<sup>3</sup> Committee on High Temperature Carbonisation.

Nevertheless, although the supply was fixed, the quantity of coal tar products that could be used as petroleum substitutes could be increased by diverting them from other uses. Normally only about a tenth of Britain's creosote was burned as fuel. Of the remainder, some was exported and some used on the home market as a coating for wood to give protection against the weather; in the manufacture of firelighters and crucible pots; in the manufacture of disinfectants; as a 'fluxing' oil for bitumen and as the 'wash oil' used to remove benzole from town's gas. Creosote was also being used in the late 'thirties, as we have noted, as a feedstock for the hydrogenation plant at Billingham.<sup>1</sup>

All these uses of coal tar products were necessary and there was never any question but that these uses should retain first call on supplies. However the pre-war plans had assumed that much of the tar distillers' output would be burned in place of imported petroleum fuel oil. This substitution went forward as planned at the expense of creosote exports, which were forbidden in January 1940. From a normal 50,000 tons a year the amount of creosote burned as fuel oil had risen to about 140,000 tons a year by May 1940; and the tar distillers were confident that it would increase to about 240,000 tons by the following August. Since most of the exports had been to the United States, increased domestic utilisation involved a loss of dollar earnings which was becoming increasingly important in the Government's calculations. The Pratt Committee calculated, however, that the saving in dollar currency from using creosote to replace imported fuel oil would outweigh the dollar loss in exports.<sup>2</sup>

Nevertheless the committee had doubts about the fuel oil substitution programme. Perhaps it would be better for the tar distillers to produce less creosote and more refined tar, thereby reducing the amount of feedstock imported in precious tanker space for bitumen production at oil refineries in Britain. The committee reckoned that every ton of bitumen replaced by refined tar would save roughly 1.3 tons of imported oil.<sup>3</sup> The committee looked with greater favour, however, on the idea of expanding production of benzole—the light oil fraction distilled from coal tar, and also extracted in much greater quantity from coal gas. In 1939 the output of crude benzole amounted to about 350,000 tons, which yielded some 225,000 tons of refined benzole, most of which was marketed as motor fuel by the National

Benzole Company. Both the Falmouth Committee in 1937, and the Pratt Committee in 1940, thought output should be raised in war-time.

The greater part of Britain's benzole was produced by the metallurgical coke industry. This industry had raised its output considerably in the middle 'thirties following the encouragement to home oil production offered by the British Hydrocarbon Oils Production Act of 1934.<sup>1</sup> By the outbreak of war about 98 per cent. of the coke ovens possessed plants for stripping benzole from the gas they produced as a by-product. At best, the Pratt Committee thought, another 4,000 tons a year might be obtained through better methods of operation. But in the gas industry there seemed to be far more scope for expansion. Many gas undertakings did not have a benzole recovery plant; and among those that did, the average yield of benzole per ton of coal carbonised was only two gallons, compared with three gallons produced at coke-oven recovery plants. This was because benzole production was far less profitable for gas manufacturers, and, moreover, presented them with a technical problem. The constituents of benzole have a heat value which is lost to the gas when the benzole is stripped from it. 'Scrubbing' for benzole also reduces the quantity of gas produced from the coal. This did not matter to the coke manufacturers for whom gas was a by-product—some of them, indeed, burned their gas to waste instead of selling it. But for the gas manufacturers, stripping for benzole meant that both the quantity and the quality of their main product would be reduced. For many of the smaller gas undertakings the loss incurred in producing benzole was greater than the gain they could make by selling it. Many, indeed, could not strip their gas without reducing its calorific value below the level they were obliged by law to maintain.

Economic considerations of this kind could yield to war-time necessity. The Pratt Committee estimated that another 55,000 tons of crude benzole a year (equivalent to 30,000 tons of motor benzole) could be obtained by installing benzole recovery plant at gasworks. It calculated that about 6,000 tons of steel would be needed to make the plant and that the cost would be about £300,000. The Pratt Committee also offered an opinion on the best way of getting the industry to produce more benzole. It thought that a campaign of advice and persuasion would be as effective as legal compulsion, and recommended that each undertaking should be approached individually so that its particular circumstances could be considered. The Pratt Committee also recommended that a small committee should be set up to give the gas industry advice on benzole recovery. The Government accepted all these suggestions.

<sup>1</sup> See p. 22.

<sup>2</sup> They calculated that the proceeds of a ton of creosote sold for dollars could buy between 1.5 and 4.3 tons of dollar fuel oil, depending on the currency in which freight was paid each way in each case.

<sup>3</sup> Assuming that every ton of asphaltic 'topped' crude imported is refined to produce 10 cwts. of bitumen and 7 cwts. of other oil products. Owing to the lower calorific value of tar fuel oils, for every ton of tar oil burned under a furnace only 0.85 of a ton of imported petroleum was saved.

<sup>1</sup> 24 and 25 Geo. 5 c.4.

Another Bragg Committee, under Lord Ridley,<sup>1</sup> studied using coal gas as a replacement for the mixture of air and fuel vapour whose expansion, when heated by ignition or compression, provides the motive power of the internal combustion engine. Here there was a choice of two systems. In one, gas supplied from an external source was carried in a container mounted on top of the vehicle; the container could either be a bag holding gas at low pressure or cylinders containing high pressure gas. Low pressure gas gave only a short range and was best suited for lighter vehicles: high pressure gas was better for heavier ones. But the manufacture of the necessary cylinders and compressors would be expensive in steel and industrial facilities. The performance of low pressure gas could be improved by using methane, which has a higher calorific value than coal gas. But supplies of methane were small and it was hard to collect and distribute.<sup>2</sup> A fundamental disadvantage of using gas containers mounted on the vehicle was that a chain of gas-filling stations would have had to be erected before they could be used on any great scale. Because of this, and their limited range, vehicles driven in this way would, moreover, have been virtually confined to urban areas.

There was, however, another gas-fuelling system suitable for large vehicles on long-distance runs. In this system the gas was manufactured on the vehicle itself in a portable gas-making unit called a producer. This method had attracted much interest before the war when it had been widely adopted on the Continent. In Britain the Minister for the Co-ordination of Defence in 1937 appointed a committee under Sir Harold Hartley to look into the producer unit's war-time potentialities.<sup>3</sup> During 1938 and 1939 the Hartley Committee, through a technical sub-committee, carried out a large number of running tests with different types of producer units. In December 1939, it reported the development of a satisfactory producer unit, together with a trailer for carrying the unit and its solid fuel. The design of this Government Emergency Type Gas Producer, as it was called, was published early in 1940. A main problem was finding a suitable fuel. Neither ordinary raw coal nor ordinary coke could be used in producers. Charcoal, which was suitable and was widely used for the purpose in France, was scarce in this country. The Hartley Committee recommended using low volatility anthracite coal from South Wales. It also advised that a

<sup>1</sup> Committee on use of Home-produced Fuels in Internal Combustion Engines.

<sup>2</sup> Methane is the main constituent of the 'natural' gas released in deep drillings for petroleum and of the 'fire damp' produced in coal mines. The 'activated sludge' method of sewage disposal also releases a gas composed of 70 per cent. methane. Only a limited number of sewage plants were equipped with sludge digestion plant capable of collecting methane in appreciable quantities and most of this gas was used as a fuel at the sewage works itself.

<sup>3</sup> Committee on Emergency Conversion of Motor Vehicles to Producer Gas.

suitable coke could be manufactured by the low temperature carbonisation industry.<sup>1</sup>

Meanwhile, with the outbreak of war public interest in the use of gas motor fuel had increased. In November 1939 the Government was questioned on the subject in the Commons.<sup>2</sup> The Secretary for Mines used the occasion to give a little encouragement to potential gas users; his motive was not to reduce petrol consumption, but to enlarge the fund of operating experience. He therefore explained that he had no intention of bringing alternative fuels into the rationing system or of laying a tax upon them.<sup>3</sup> His announcement was followed, in January 1940, by an Act of Parliament which removed certain legal and financial disincentives to the conversion of motor vehicles to run on gas.<sup>4</sup>

The implication of the Minister's statement was that people who equipped their vehicles to run on gas could use it freely to supplement their ration of liquid motor fuel. But as a stimulus this proved too weak. A few vehicles, mainly private cars, were converted to run on low pressure gas carried in bags; but by August 1940 there were still no more than a thousand such converted vehicles on the road. As for the adoption of producer units, this made no headway at all. The incentives offered by the Government were insufficient to persuade commercial transport operators to pay the high cost of converting their heavier vehicles, and to accept the big decline in operating efficiency which running on producer gas would have entailed.

Against the background of these developments the Ridley Committee on the use of gas as a motor fuel came out strongly against the idea of converting large numbers of vehicles to run on gas. Even if wide-spread conversion had been feasible (and in fact, available supplies of low volatility anthracite and low temperature coke could not have supplied gas for more than 10,000 vehicles) the committee argued that Britain could not afford a decline in the efficiency of her motor transport, nor the absorption of other scarce resources also involved. In a final report, in August 1940, the Ridley Committee did suggest, however, certain preparations that should be made against the possibility that liquid fuel would become too scarce to meet even the needs of really essential transport. The committee also indicated how it thought transport operators should be induced to

<sup>1</sup> Report of the Committee on the Emergency Conversion of Motor Vehicles to Producer Gas (H.M.S.O. 1941).

<sup>2</sup> H. of C. Deb., Vol. 353, Cols. 224-228, 8th November 1939.

<sup>3</sup> H. of C. Deb., Vol. 353, Cols. 224-225, 8th November 1939.

<sup>4</sup> The Gas and Steam Vehicles (Excise Duties) Act, 1940 (3 and 4 Geo. 6 c. 6). This permitted the weight of gas equipment to be deducted from the total unladen weight on which the tax paid by goods vehicles was assessed. Omnibuses were also permitted to draw trailers carrying producer plant and the speed limit on vehicles drawing trailers was raised.

convert their vehicles to gas if need arose. The Ridley Committee emphasised, moreover, that its negative conclusions might be nullified by technical progress, and urged the establishment of a small permanent committee to stimulate research into the use of gas motor fuels and to keep abreast of changes this research might bring about.

One other petroleum import-saving measure was investigated in the early months of the war. This was the reclamation of lubricating oils which, unlike fuel oils, are only partly consumed in use. By the late nineteen-thirties it had become technically possible to submit discarded lubricants to a 'laundering' process which made them again fit to use. Government interest was aroused, and in June 1939 a departmental memorandum suggested that the laundering process should be kept under periodic review. From one such review it emerged, in February 1940, that the three Services were already sending their waste lubricating oils to be rehabilitated. Later, in the spring of 1940, the War Office took the initiative in pressing for a national scheme for the collection and reclamation of used lubricants. The matter was considered by the Oil Control Board, and the Petroleum Department asked Shell-Mex House to look into the possibilities.

The enquiry was conducted by the Lubricating Oil Pool which issued a first report in August 1940, and a final report, four months later. The findings were discouraging. The Lubricating Oil Pool calculated that only about a fifth of the lubricating oils used in Britain yielded waste which could be collected for reclamation treatment. Of this only about 30 per cent. was collectable, and, because of losses in the 'laundering' process, the actual yield of clean oil would be only about 85 per cent. of the amount collected. These findings meant that, out of a total consumption in Britain of some 500,000 tons of lubricating oils a year there would be little more than 30,000 tons of treatable waste, including lubricants which the Service departments were already having 'reclaimed'. The total *extra* yield of clean lubricating oil from a nation-wide recovery and collection scheme would amount to only about 10,000 tons, or one tanker cargo, a year. Moreover, these extra waste oils reclaimed would come almost entirely from garages and smaller commercial users; and, because of the mixture of grades, it was waste from this source which was technically most difficult to treat and most trouble to collect. In any case a great deal of waste oil was already being put to good use in 1940. Many large consumers of lubricants either treated their waste lubricants themselves at their own filter or centrifuging plants, or sold it for use as fuel oil at a higher price than the reclaiming firms could pay. Alternatively they used it as fuel themselves.

The Lubricating Oil Pool therefore advised against the adoption

of a national scheme for the recovery of waste lubricating oils. It recommended, instead, that the existing private arrangements should be encouraged and developed since these put no strain on transport capacity. As between reclaiming lubricants and burning them as fuel, it strongly preferred the last, pointing out that this saved more tanker space, since in reclamation there was some refining loss.

So much for the measures to reduce Britain's dependence on seaborne oil supplies in the opening months of the war. How those seaborne supplies were organised and maintained is considered in the following chapter.

## CHAPTER IV

### IMPORTS

(i)

#### A Problem of Shipping

IN the last chapter it was mentioned that the outbreak of war was followed by a fall in oil consumption of roughly 20,000 tons a week. The Oil Board had expected some decline as a result of civilian economies, but it had not expected a drop of this order. It might have been anticipated that low consumption would be accompanied by a rise in stocks, especially since these were still far below the level thought desirable at the start of a major European war. In fact nothing of the sort occurred. Far from rising stocks fell sharply; at the end of May 1940 they had fallen by 800,000 tons. Although consumption had declined beyond expectations the level of imports had declined even more dramatically, as the accompanying table shows:

TABLE 4  
*United Kingdom Oil Imports by Source 1939-40\* (weekly average)*

	Total†	Carib- bean‡	U.S.A.§	Iran	Eastern Medit- erranean	Other
1938	223·4	102·4	39·6	43·2	23·7¶	14·5
September- November 1939	144·1	66·6	27·7	34·3	10·2	5·3
December- February 1940	211·6	83·4	28·6	55·7	27·8	16·1
March-May 1940	255·3	121·7	43·4	42·8	28·0	19·4

\* Based on calendar months and therefore not strictly comparable with monthly consumption figures shown in Table 3.

† Including imports in containers and surplus bunkers.

‡ Dutch West Indies, Trinidad and Venezuela.

§ Mainly from Gulf of Mexico ports.

|| Iraq and Roumania.

¶ Including 5,300 tons a week from U.S.S.R.

The trouble did not lie with oil procurement. As the table indicates this was not a problem in these early months of the war. Supplies were obtainable from all main sources, including Roumania which the Oil Board had discounted as a war-time supplier; indeed imports from that country were higher than usual owing to a deliberate Allied effort to divert Roumanian oil away from Germany. Oil imports into Britain fell because of difficulties on the shipping side.

This too was unexpected. As recently as February 1939 the Sea Transport Department had reported that there would be more than enough tankers available to meet the needs of Britain and France combined if the Mediterranean route remained open and oil could be lifted from United States ports. What had happened to falsify this prediction?

Shipping capacity is determined not only by the number of ships available but also by the efficiency with which each ship can be operated. The Sea Transport Department had calculated the number of oil tankers that would be available to the British after deducting, from the total British-flag fleet of ocean-going tankers (that is tankers registered at United Kingdom or other ports in the British Empire which were not owned by the Admiralty, and had not been constructed to operate in shallow or coastal waters), the number likely to be required in war-time for carrying molasses, whale oil, vegetable oils etc.; and also the number that the Navy was likely to require for fleet attendance duties. After these deductions the Department made an allowance for the number of vessels likely to fall into enemy hands at the start of hostilities.<sup>1</sup> To the total figure thus arrived at the Department added new tankers under construction which were expected to be in service by 1940. Further details of these calculations need not detain us. Errors here could make little difference since the additions and subtractions were small by comparison with the total. It so happened that the Sea Transport Department underestimated the number of British tankers that were to be launched by the outbreak of war. But their forecast of the amount of British-flag tonnage likely to be available was not significantly wide of the mark.

The Department had gone on to assume that the strength of the British tanker fleet would remain the same throughout the first year of war. No allowance was made for sinkings since the Admiralty did not believe that any useful forecast could be made; but the convoy system was expected to keep losses down to a level which could be

<sup>1</sup> Under the worst contingency (which had showed a deficit of six tankers) it was assumed that thirty-six British tankers, which might be in the Baltic or Mediterranean Seas when war broke out, would be lost. It was assumed that ten out of twenty-two British molasses tankers could be used for carrying petroleum; and that fourteen British whale oil ships could be used as tankers for half the year, i.e. during the Antarctic winter.

matched by new acquisitions. This expectation proved too optimistic, though again not significantly so. Only seven British tankers were launched in the nine months after war broke out, a lower rate than was expected. This was because private tanker building, which had been unusually high in 1938, fell away sharply after the introduction of the Merchant Shipping Assistance Bill in July 1939. This Bill did not extend its benefits to tankers, so that the construction of other kinds of ships was fostered at their expense. On the other hand, twenty-two British tankers (and two French) were sunk during those first nine months. Five went down in the first ten days of the war before convoy protection had been arranged, and others fell victim later to the new magnetic mines laid by the Germans off the coasts of Britain. There were some gains by transfers of flag,<sup>1</sup> but, even so, there was a net loss to the British-flag tanker fleet. This loss was too small, however, to invalidate the estimate significantly.

What of the assumptions about the supply of neutral tankers? The Sea Transport Department had calculated that there would be some 300 neutral tankers surplus to world trade requirements on which the Allies would be able to draw. In fact neutral tankers proved less easy to come by after the outbreak of war than had been predicted. The uncertain outlook made other countries anxious to build up their own oil stocks, and the demand for tankers in neutral trade increased beyond expectations. It increased all the more since the efficiency of vessels in neutral trade also suffered from delays imposed by the Allied blockade, with its system of inspection; and because a number of neutral tankers in neutral trades were damaged or sunk by the Germans. Thus, instead of finding, as expected, a surplus of neutral vessels competing to work in Allied service, the Allies found themselves competing for tonnage with neutral charterers who offered high rates of hire and lower risks.<sup>2</sup>

The key to the supply of neutral tankers lay with Norwegian tanker owners who owned most of those available for charter. At the outbreak of war there were about 250 ocean tankers under the Norwegian flag, nearly all of them owned by relatively small ship-owners who chartered their vessels to the oil companies. Of these, fifty-six<sup>3</sup> were already on time-charter to British, French and Dominion charterers, eleven of them being employed exclusively for four summer months every year in carrying oil down the St. Lawrence River to Montreal. Of the remainder many were tied up on long-term charters to United States and other foreign oil interests.

<sup>1</sup> One German tanker was captured, one American tanker purchased, and four Panamanian tankers were transferred to British registry.

<sup>2</sup> World tanker tonnage in 1939 is given in Table 15, p. 243.

<sup>3</sup> Thirty-eight to British oil companies, seven to French and the eleven 'Montreal' tankers.

There were, however, over a hundred working on charter for single voyages; and it was to these last that the Allies looked for an immediate addition to their tanker resources.

As soon as war broke out the British government began to negotiate with the Norwegians to secure a large bloc of tonnage on time-charter; first, informally, through a leading Norwegian shipowner then in London; next with a Norwegian Government delegation; and finally with a Norwegian shipowners' delegation. Nearly three months were to elapse before they were able to come to terms. The Norwegian government was anxious not to compromise its neutrality, and immediately on the outbreak of war it issued a proclamation to the effect that charter parties for Norwegian ships would not be valid without governmental approval. Its delegation to London was interested only in discussing the conditions under which it would be prepared to allow tankers already in Allied service to remain there. It was not until October, after a hint that Britain might become less disposed to buy Norwegian fish or sell coal to Norway, that the shipowners' delegation came to Britain to discuss the chartering of extra vessels.

Even then the Norwegian shipowners, with plenty of neutral business available, were in no hurry to strike a bargain. It was not until 11th November that an Agreement<sup>1</sup> was finally initialled. In the Agreement the Norwegians imposed stiff conditions. The British had to pay higher rates of hire than they wished and bear the cost of war insurance with the Norwegian War Risks Insurance Club at higher premiums than British ones. They also had to pay a war bonus to the Norwegian crews. Finally, the British had to bow to the Norwegian insistence that none of their tankers should be sent to ports in Britain or France east of Southampton or Le Havre.

The British object had been to secure 1½ million deadweight tons of Norwegian tankers on time-charter. Under the Agreement the Norwegian shipowners undertook to time-charter eighty-one tankers of 900,000 deadweight tons to the British Ministry of Shipping. The balance of the 1½ million was to be made up by forty-five tankers already on charter to British and French oil companies, the eleven 'Montreal' tankers (counted in the Agreement at two-thirds of their tonnage) and two tankers on charter to United States oil companies but working in Allied trades, which the Ministry of Shipping was to take over when their oil company charters expired. The Norwegians undertook to provide the first 200,000 deadweight tons by the end of 1939, and another 250,000 tons by the end of February 1940. This was probably the best that could be expected since, of course, the tankers first had to complete the engagements they already had.

<sup>1</sup> The Agreement also covered dry-cargo tonnage.

In the event the Norwegians did as they had promised, though, pending the conclusion of a War Trade Agreement, they allowed deliveries to fall behind schedule in the early stages. It was the 18th November when the first tanker was made over under the Agreement, and by the end of 1939 only thirteen, of 141,000 deadweight tons, had been delivered. But in the following two months another twenty-three, making 426,000 deadweight tons in all, came over, and by the end of May seventy-six tankers had been time-chartered to the British and one to the French. Together with the fifty-eight on pre-war charter this made 134 Norwegian tankers of well over 1.5 million deadweight tons working for the Allies after nine months of hostilities. However, allowing for the time factor, this was roughly equivalent to the full time service of only eighty-eight tankers between September and May even after counting the 'Montreal' tonnage as fully available (which it was at that time of the year). This was far below the 150 tankers on which the Sea Transport Department had so confidently relied. However, the Norwegians were not the only neutrals in Allied service. There were others—mainly Dutch and Panamanian—employed in Allied trade by the companies owning them, or chartered for single voyages. Unfortunately a figure cannot be put to their contribution during the nine months; this would require an analysis of a large number of individual voyages, records of which are lacking. What can be said is that, in February 1940, there were fifty-two non-Norwegian neutrals working in Allied trades according to a report by the oil companies. From this it seems reasonable to infer, very tentatively, that the volume of neutral tanker tonnage available to the Allies between September 1939 and May 1940, while less than the Sea Transport Department had expected to be available, was roughly equal to what it had calculated to be needed.

The volume of tonnage available is only one factor determining carrying capacity; the other is the working efficiency of the vessels. This depends on a variety of factors whose effect can be conveniently expressed through two figures: the length of the effective tanker working year after allowing for time spent on repairs and refitting; and the average time taken by each tanker to complete a full 'round-voyage' cycle, that is sailing, loading, sailing, discharging and setting sail again. This last figure is determined by the voyage length, the average speed maintained, and the average time spent in port at each end of the voyage.

The operating efficiency of tankers was expected to decline under war conditions. Vessels running the gauntlet of bombs, mines and torpedoes were likely to be under repair more often. Round-voyage times would be longer if only because faster vessels would not be able to use their speed in convoy. In fact, the convoy system introduced



at the start of the war was nothing like so comprehensive as that which ultimately protected world shipping routes. In the beginning, for instance, vessels outward bound across the Atlantic were escorted for less than 200 miles westwards from Ireland. Then they broke away and sailed independently. But even in these early months, incoming ships kept together all the way across the Atlantic. Moreover, though at first these Atlantic convoys were organised into 'fast' (twelve knot) convoys and 'slow' (nine knot) convoys the speed of the fast ones was soon reduced and they were abolished altogether in February 1940. Vessels bound for the Middle and Far East were convoyed as far as Gibraltar, but also only in nine-knot convoys. Most modern tankers of those days could make twelve knots or more.<sup>1</sup>

Apart from slow sailing while in convoy, another factor lengthening round-voyage times was the need for tankers to take roundabout routes to pick up their convoys. Thus, tankers homeward-bound from the Dutch West Indies and the Gulf of Mexico (which formed the overwhelming majority of those on Atlantic routes), could not come straight across to Britain; instead they had to go far out of their way north to the convoy assembly point at Halifax, Nova Scotia. Not until May 1940 was an alternative point of assembly for tankers established further south (at Bermuda) from which they could sail to join the trade convoys at sea.<sup>2</sup> Finally, the convoy system entailed not only increased voyage times but also longer turn-round times in port. Arriving in bunches instead of singly the tankers had to await their turn to load or discharge; and once free of the port they had to wait again at the convoy assembly point.

The Sea Transport Department had not overlooked the effect of war conditions on operating efficiency when making their estimate of war-time requirements. Thus, they assumed that the tanker working year would be shorter than in peace-time. Before the Second World War it was generally reckoned that tankers plying to Britain would be out of action for a maximum of thirty days in every year. But the Department's calculations of the number of tankers needed to supply this country in war were consistent with an allowance of thirty-six days for repairs and refitting. It is impossible to determine whether this allowance was sufficient. No records of tanker performance were kept by the Government in these early months against which the estimated allowance can be checked. Evidence suggesting that it was about right comes from a calculation of tanker requirements made by Shell-Mex House in February 1940, which allowed thirty-five days a year for repairs and refitting. But only qualified

reliance should be placed on a figure that reflects the operating experience of no more than four months of war. It seems reasonable to suppose that the crash programme for 'degaussing' merchant ships to counteract magnetic mines must have further shortened the 'tanker working year' after the end of 1939.

As for delays caused by sailing in convoy the Sea Transport Department had made what it thought was a sufficient allowance by basing its calculations on the assumption that each tanker would sail at only eight knots throughout each voyage. This rough-and-ready approach to the task of estimating war-time tanker performance contrasts markedly with the deceptively precise calculations about tanker availability. Analysis of the Department's estimates suggests that they were consistent with an average round-voyage time of roughly fifty-nine days by tankers bringing oil to Britain; this may be compared with a 1938 figure which must have been well under fifty days. Even so it seems clear that the Sea Transport Department underestimated the war-time decline in efficiency. In its calculations of early 1940, Shell-Mex House allowed sixty-six days for an average round voyage of tankers supplying this country.

One factor of special importance during the first six months had certainly been overlooked, namely the time lost by ocean tankers in slow movements along the coasts of Britain. It will be remembered that the pre-war plans had assumed that incoming cargoes would be mainly discharged at British west coast ports because of the air raid danger in the east. This danger did not materialize to anything like the extent foreseen. As a precautionary measure, however, all incoming vessels were directed to the west coast ports in the first two weeks of war, and again during October 1939, after the end of the campaign in Poland. Taking the first six months as a whole, the east coast ports of Britain still handled no less than 39 per cent. of the country's oil imports—only 8 per cent. less than during 1938. These tankers which unloaded on the east coast had to travel in coastal convoys whose speed was determined by that of small and slow coastal craft. Between September 1939 and the end of February 1940, fifty-one tankers carrying cargoes for Shell-Mex House made the trip round to the Humber and ports further north. Each of these tankers took between ten and twelve days longer on the round voyage than if it had discharged its cargo on the west coast of Britain.

<sup>1</sup> See S. W. Roskill: *The War at Sea*, Vol. I, (H.M.S.O. 1954).

<sup>2</sup> See S. W. Roskill, *op. cit.*, Vol. I.

(ii)

## The First Winter

The story of the opening months of the war begins, then, with the Allies having at their disposal a tanker fleet roughly the size which pre-war planners had thought necessary, but operating less efficiently than the planners expected. This impaired operating efficiency would have kept United Kingdom oil imports low. The dislocation of shipping movements in the early weeks of war reduced oil imports still more drastically.

Part of this initial dislocation arose because much of the oil imported into Britain (some 40 per cent. in the summer of 1939) came in foreign tankers, especially Norwegians, while many British tankers were employed in foreign trades. It was impossible to bring these British tankers into Allied service immediately. A fortnight after war broke out nearly a fifth were still in neutral service. On the other hand, as soon as war broke out the Norwegian tankers at sea in British service were ordered by the Government of Norway to put into neutral ports. There they remained while the terms of their war-time employment were being negotiated with the Norwegian government delegation in London. Not until the middle of October did the first Norwegian tankers in British service start to move again.

But it was not only Norwegian tankers that stopped working in the opening weeks. Many of the British-flag tankers which were already in British service were temporarily immobilised as well. Some, bound for danger areas, happened to be in ports overseas when war broke out and were instructed to stay there until escort could be arranged for them. Others were in British ports and anchorages acting as floating storage for aviation spirit while work on the Air Ministry's storage programme went ahead. It was not until the middle of October that shore storage was available into which the first of these tankers could discharge their oil. The effect on imports of this early dislocation of tanker movements has been shown in Table 4.<sup>1</sup> Its effect on stocks was dramatic. By the end of November these had fallen by a million tons. During the winter, when tanker efficiency is normally at its lowest, imports improved as tankers adjusted to war-time service and got into their stride again. From December 1939 Service stocks ceased to fall: indeed stocks of aviation fuel rose slowly. But this improvement was partly at the expense of civil stocks, which went on falling down to the end of February.

The decline in stocks was less significant than might appear from

the figures just quoted. It had always been intended that both the Navy and the civil economy would draw heavily on reserves in the first year of war. At the end of February 1940 both naval and civil oil stocks still had a fair way to go before reaching the lower levels to which they must be held during war. Indeed, if the total stock level at the end of February is compared with the level believed necessary for security at that time—and this is the true criterion of its adequacy—it appears that, so far from weakening, the United Kingdom oil stock position had actually grown stronger since war broke out. United Kingdom stocks of liquid oil products at the end of February 1940 were 97 per cent. of the then approved target level; six months earlier they had been 88 per cent. of the (higher) level then thought desirable.<sup>1</sup> And this despite the fact that, in the interval, there had been a change of mind on the lower target level. In December 1939 the Admiralty decided that it could only allow its stocks to fall by 25 per cent. instead of 50 per cent.

But this is a retrospective view. It was not the way things looked in the winter of 1939–40. Then, the fact that stocks were falling loomed large, and the fact that they had been expected to do so was forgotten, or overlooked. The point was that, before the war, the fall had been expected to take place in association with high consumption by the Services and heavy air raids on oil ports and storage. In the event it occurred at a time when Service consumption was low and supply conditions as favourable as they were every likely to be. Moreover, the fall coincided with difficulties on the home front. An unusually cold winter, accompanied by a partial breakdown in coal distribution, had led to a sharp rise in the demand for paraffin and fuel oil for heating. Shell-Mex House began to complain that it was finding it difficult, with stocks so low, to maintain a smooth and regular distribution of all products. Nor was it only in Britain that stocks were down. Reports of inadequate supplies and dwindling reserves came in from oil bunker stations abroad. Similar reports came in from Paris as well. The French had also seen their imports fall far below expectation during these opening months of warfare and complained bitterly about it to their ally.

In January 1940 the outlook seemed particularly unpromising. Tanker casualties, which were insignificant after the first fortnight of the war, had risen sharply in December when the enemy began using magnetic mines. Between December and February over 150,000 deadweight tons of British tanker tonnage was sunk and 67,000 deadweight tons damaged—over 60 per cent. of it by mines. It was

<sup>1</sup> At the outbreak of war, target stocks were 7.4 million tons and actual stocks 6.5 million tons (stocks of crude and process being taken as equivalent to the amount of refined products they could have yielded). At the end of February 1940 the comparable figures were 5.7 million and 5.56 million.

<sup>1</sup> See p. 103.

a rate of loss which, if maintained, would cut deeply into British tanker strength since the rate of British new tanker construction was still low. Meanwhile the Norwegian tankers were slow in coming forward. The Norwegian government was seeking to link the fulfilment of the Shipping Agreement with the conclusion of a War Trade Agreement satisfactory to themselves; they wished to extract concessions concerning their trade with Germany. Little headway was made during December and January, and early in the new year the Norwegian shipowners were instructed by their government to delay the delivery of tankers negotiated under the Shipping Agreement.

The British authorities therefore took a number of steps to ease pressure on stocks. The Ministry of Shipping's instruction to shipowners to curtail bunker offtake and to bunker abroad has already been mentioned.<sup>1</sup> So also has the prohibition of the export of creosote which was now required as furnace fuel in place of imported petroleum fuel oil. Ships were encouraged to carry more bunker oil than they required when this could be done without shutting out cargo, and to discharge the surplus in Britain. Another expedient, considered but rejected, was the import of fuel oil in the double bottoms of dry-cargo vessels. This had been done in the First World War, but in 1940 it was thought to be too wasteful of dry-cargo shipping capacity, then in even shorter supply.

These were small measures. A more radical approach to the problem was to seek to improve the efficiency of tankers by reducing the average round-voyage time. In February Shell-Mex House ceased to send tankers to the east coast north of the Thames; this not only reduced round-voyage times but kept the vessels out of the most dangerous waters.<sup>2</sup> The oil companies also sought to economise in tanker hauls by exchanging markets with one another. For example, in February Shell diverted oil destined for Capetown from the Netherlands East Indies to a Caltex market in Melbourne, while Caltex supplied equivalent shipments to Capetown from its plant on Bahrain. The result was a saving of 25½ tanker days.

Finally, in February 1940 the Civil Lord of the Admiralty asked the Oil Control Board to consider a wider measure to raise tanker carrying capacity: namely, an adjustment of supply programmes to the pattern that would have obtained if the Mediterranean had been closed. This meant reducing liftings from the Middle East, particularly Iran, in favour of western hemisphere sources, thus reducing the length of tanker hauls. The promised saving in tonnage was very large. The oil companies estimated it at the equivalent of fifty-six tankers, which was worth at least 2½ million tons of oil imports to Britain in a single year.

<sup>1</sup> See p. 84.

<sup>2</sup> The last tanker discharged at the Tyne and Humber on 10th February 1940.

There were political and economic disadvantages about this proposal. The political objection was that it was likely to offend the government of Iran whose revenues would be reduced by a cut-back in oil production there. Relations were already strained because of a fall in that government's receipts from the oil industry in 1939; a further reduction might lead to an open breach, even, perhaps, to cancellation of the Anglo-Iranian Oil Company's concession.<sup>1</sup> Economically the proposal was open to the objection that drawing more oil from the western hemisphere would mean spending an extra 15 million United States dollars over a twelve month period, and this expenditure the Treasury was anxious to avoid.<sup>2</sup> It all seemed a high price to pay for dealing with a situation which, as the Civil Lord himself admitted, was serious but not catastrophic; and the Oil Control Board left the final decision to the War Cabinet. In forwarding the problem, the Board refused to recommend acceptance of the Civil Lord's proposal in its entirety. To ease the immediate situation, the Board suggested that the supply pattern could be modified, but only to a limited extent and only for three months. For its part, the War Cabinet decided that the saving in tonnage, resulting from the Board's suggestions would not be worth the trouble which might ensue. On 14th March it turned down the Board's compromise proposal.

The War Cabinet's decision had not been easy to reach, but the decision was to be fully justified by events. In February 1940 the Anglo-Norwegian war trade negotiations were successfully concluded and the effects of the Shipping Agreement with Norway began to be felt. From March to May monthly oil imports into Britain averaged over 1·1 million tons. Stocks began to rise, and seemed likely to continue rising. For one thing the rate of tanker casualties had fallen again; only three British tankers were sunk and two damaged by the enemy during the three spring months. In addition, neutral tankers were becoming more plentiful. The Norwegians, in return for

<sup>1</sup> Under the terms of the revised concession granted to the company in 1933, the Iranian government received a royalty of 4s. od. on each ton of oil the company sold or exported. The government also received a share in any distribution which the company made to its ordinary shareholders above £671,250. In addition, the Iranian government benefited from a production tax of 9d. per ton of oil produced up to 6 million tons a year, and 6d. per ton thereafter. Finally, when the price of gold in London was in excess of £6 per troy ounce, the government received a so-called 'gold premium' on all its receipts from the company other than those derived from its participation in the profits. The terms of the concession provided that the annual payments by the company to the Iranian government should not fall below £750,000.

In 1938 the Anglo-Iranian Oil Company's payments to the Iranian government totalled £3·3 million; in 1939 they totalled £2·7 million. This fall was due partly to a drop in exports and local sales of oil from 9·3 million tons in 1938 to 8·4 million tons in 1939; and partly it was due to a fall in the dividends declared by the company. However, in 1939 the Iranian government received a higher 'gold premium' payment which partly offset the fall in its receipts.

<sup>2</sup> See below p. 147 *et seq.*

concessions in the War Trade Agreement, had already offered an additional ten tankers for time-charter. In April the Ministry of Shipping began to negotiate for still more Norwegians. Hopes of success were high, for by this time the Allies had persuaded most of the European neutrals to limit their stockbuilding, thus reducing world demand for tonnage. There were reports that more Standard Oil Company (New Jersey)-owned Panamanian-flag tankers would soon be available for Allied, mainly French, service: the obstacle here was the reluctance of the crews to sail into the war zone.<sup>1</sup>

In March 1940, then, the barometer was set 'fair'. The military events of the following months transformed the whole situation, and confronted the British oil authorities with new, and largely unanticipated problems. These events and what followed from them will be described in Chapter VI. The rest of this chapter will examine how the system of administrative control stood up to the first test of war conditions.

## (iii)

## Reshaping the Oil Control

Experience during the autumn and winter of 1939-40 disclosed two administrative weaknesses in British supply arrangements for oil. First, a lack of effective governmental authority over the movement of oil supplies and tankers. Second, the absence of any means for ensuring that the planning and programming of oil supplies to Britain was co-ordinated with programming supplies to other Empire territories, and countries outside the Empire, which relied wholly, or in part, on British-controlled oil sources and tankers.

It will be recalled that at the start of the war the Government had left to the oil industry's personnel at Shell-Mex House the actual executive work of organising the movement of supplies from overseas. To perform this task, two committees had been set up at Shell-Mex House—the Overseas Supply Committee and the Tanker Tonnage Committee. In relying on the work of these committees, the Government had placed itself almost entirely in the hands of the oil industry in the important field of supply policy. The intention had been that the Oil Control Board should act as a supreme executive body,

<sup>1</sup> Since June 1939, twenty-three American-flag tankers had been transferred to the Panamanian flag to avoid the ban imposed by the Neutrality Act on entry into the war zones. Seven Panamanians were transferred to Allied colours, four to the British flag and three to the French.

holding the initiative in promoting measures to 'maintain' supplies 'including the provision of tanker tonnage'. But neither the Board nor any other Government body was in a practical position to do this. None of them was equipped to form an independent and informed appraisal of the oil industry's supply and tanker programmes because all the information upon which such an appraisal could be based was at Shell-Mex House. This situation also made a mockery of the day-to-day Government control of tanker movements presumably exercised through voyage-licensing, for Government representatives lacked the knowledge required to assess whether particular voyages were really necessary. This state of affairs could not continue for very long. As Sir Arthur Salter, then Parliamentary Secretary to the Ministry of Shipping and a member of the Oil Control Board pointed out, it was not inconceivable that supply arrangements decided upon by the oil companies could be biased by commercial considerations. Such bias—for instance a wish to hold on to traditional markets—might not coincide with what the Government thought desirable for strategic or political reasons. In the event of a clash of this kind the Government might find it difficult to impose its views against the weight of arguments put forward by the trade.

Largely at Sir Arthur Salter's instigation, the Government remodelled its control machinery in May 1940. The status of the Petroleum Department was raised: it was taken out of the Mines Department and given separate identity under its own Minister. The Chairman of the Oil Control Board, Mr. Geoffrey Lloyd, ceased to be Secretary for Mines and became the new Secretary for Petroleum. Until June 1942 the Petroleum Department, like the Mines Department, remained in a loose subordination to the Board of Trade. It then became a Division of the Ministry of Fuel and Power set up in that month, and Mr. Lloyd became one of two Parliamentary Secretaries attached to the Ministry. Until the end of 1943, the Ministry also had two Permanent Secretaries—one of them for petroleum affairs. Despite these changes in organisation, in practice the Petroleum Division continued to function after 1942 in virtual independence under Mr. Lloyd.<sup>1</sup>

A logical step, once the Petroleum Department had gained its separate identity, might have been to incorporate within it part at least of the Shell-Mex House organisation, adding also a tanker section which could have been detached from the Ministry of Shipping. The Minister of Shipping would have objected to this transfer, however, not least on the grounds that tankers could be used, and

<sup>1</sup> For reasons of convenience it will accordingly be referred to as the Petroleum Department throughout this book.

in the near future might well have to be used, for carrying commodities other than petroleum. In the event, a less drastic plan was adopted for securing tighter liaison with, and control over, the oil industry's shipping activities. The Permanent Under-Secretary for Petroleum, who was the Civil Service head of the new Petroleum Department, was given his own quarters at Shell-Mex House in order that he could keep in close touch with the work of supply programming; and he spent part of every day there. He was assisted by two junior officials, one from the Petroleum Department and the other from the Ministry of Shipping (in fact, the Secretary of the Ministry of Shipping's Tanker Licensing Committee). Another assistant from the Petroleum Department was added in 1941. These Government officials had access to working papers circulating in Shell-Mex House.

Liaison between Shell-Mex House and the Government's administrative machinery was strengthened by appointing Sir Andrew Agnew, the chief executive at Shell-Mex House, together with the Permanent Under-Secretary for Petroleum, to membership of the Oil Control Board. Nonetheless, the Oil Control Board remained too many steps removed from actual direction of oil supply movements to be an effective instrument for controlling supply policy. Conscious of this fact, the Board created a sub-committee of officials whose members were better briefed and able to meet more frequently than members of the parent body. This new Executive Committee of the Oil Control Board was to take over closer supervision of the work of choosing supply sources and allocating tanker tonnage.

The Executive Committee met for the first time on 12th June 1940. It was closely linked with Shell-Mex House. The vice-chairman was Sir Andrew Agnew himself; the chairman was the Permanent Under-Secretary for Petroleum who was also of course the principal link between the trade organisation and the Petroleum Department. Thus, the permanent head of the Petroleum Department was cast for a dominant role in the work of the Executive Committee (indeed, it was at one time contemplated that he should devote all his time to it) and it was his assistants in the Department who acted as secretariat for the Executive Committee. With the creation of this committee the Oil Control Board's Tanker Tonnage Committee became redundant. It met for the tenth and last time on 22nd April 1940.

Improved governmental control over the work of Shell-Mex House was only one aspect of the necessary reforms: another was to make the trade organisation itself a more effective executive instrument. So far, as has been explained, Shell-Mex House had been merely the headquarters of the Petroleum Board, a combination of importing and marketing companies which had pooled their distribution facilities

in this country and, as a matter of convenience, set up two joint committees to co-ordinate their individual supply and shipping arrangements for the United Kingdom market. Neither the Petroleum Board nor the two committees had anything to do with the supplies for overseas areas which the companies handled individually, exactly as in time of peace. This obviously left scope for an inefficient deployment of scarce resources. In the absence of a comprehensive overall programme there could be no certainty that tankers, for instance, were being used to the best advantage. During the tanker shortage in the winter of 1939-40 it was not only the Government which lacked knowledge to assess the merits of proposed tanker voyages; the industry itself had often put forward shipping arrangements on a basis of incomplete information.

It was an obvious move to give Shell-Mex House responsibility for programming oil supplies throughout the Empire. This was done in May 1940 with benefits which soon became apparent. From the summer of 1940 regular forward programming—embracing the whole area of British supply responsibility—became a feature of British oil administration. Quarterly short-term loading programmes, and quarterly supply programmes covering twelve months ahead, were issued under the auspices of the Executive Committee whose staff participated in preparing them. These were sent on, after discussion, to the Oil Control Board. On the organisational side this widened responsibility was reflected in the development of a world-wide administrative network under the control of Shell-Mex House. The oil companies trading in overseas areas for whose supplies Britain was responsible co-ordinated supply arrangements through committees similar to the Overseas Supply Committee in London. In September 1941 a Co-ordination and Development Committee began to meet at Shell-Mex House to pull together the activities of all these regional supply committees, including that for Britain.

The enhanced role of Shell-Mex House was also reflected in the spring of 1940 in the emergence of yet another new body—the Trade Control Committee. This held its first meeting on 15th May and subsequently met three or four times a week. The Trade Control Committee was the supreme directorate of the oil industry, controlling overseas operations as well as distribution within this country.<sup>1</sup> It also provided a convenient channel through which Government views could be regularly transmitted. Sir Andrew Agnew took on the chairmanship, thus linking the Trade Control Committee directly with the Government through his membership of both the Oil Control Board and its Executive Committee. The other

<sup>1</sup> The 'Petroleum Board' continued as the legal and financial entity which marketed oil in this country.

members of the Trade Control Committee were: the chairmen of the Overseas Supply and Tanker Tonnage Committees; the chairman of the committee responsible for oil distribution within Britain; the chairman of the Lubricating Oil Pool; and the chairman of the committee handling the financial aspects of company pooling through the Petroleum Board. The Government official who was chairman of the Executive Committee and Permanent Under-Secretary of the Petroleum Department also attended every meeting of the Trade Control Committee, although only in the capacity of an observer. This arrangement continued unaltered down to the middle of 1942. By then the regular presence of a high Government official at meetings of the Trade Control Committee had come to be regarded as conferring an aura of official authority to the committee's decisions. For this reason the Government official who at that time succeeded to the post of chairman of the Executive Committee of the Oil Control Board decided against attendance at Trade Control Committee meetings.

(iv)

### British and French

The machinery for co-operation with the French also underwent a searching test during the brief period of the war-time alliance. The stress of tanker shortage disclosed divergencies of interest and approach which had been overlooked during pre-war consultations when it had been taken for granted that there would be plenty of tankers available.

During the first three months of war the two sides co-ordinated their affairs through French Missions for Oil and Sea Transport, which came to London as soon as war broke out. Throughout this period, the British and French were engaged in working out the operating principles of a comprehensive inter-Allied organisation to integrate and regulate the whole economic side of the common war effort, under the ultimate direction of a Supreme War Council. These discussions led to a series of combined executive committees being set up in December 1939. Each committee was appointed to deal with a separate commodity, or class of commodities; there was also a committee for the control of shipping, including tankers, along lines foreshadowed before the war. At the top was an Anglo-French Co-ordinating Committee which acted also as the supreme policy-making body below Ministerial level. As part of this structure of

economic collaboration, an Anglo-French Executive Committee for Oil was formed on 21st December. It was composed of officials from the French Oil Mission and Britain's Petroleum Department, and sat under the chairmanship of Colonel Louis Pineau, head of the 'Direction des Carburants', (which was the French counterpart of the Petroleum Department). Colonel Pineau had been closely associated with the formulation and execution of French oil policy before the war,<sup>1</sup> and this circumstance certainly had an influence on the events which followed.

Like the other commodity executives, the new Anglo-French Oil Executive was required to prepare co-ordinated programmes of requirements and supply. Its functions in regard to supply, however, differed in some respects from those of its sister committees. Unlike those committees the Anglo-French Oil Executive confined itself to framing the general outlines of oil supply policy, leaving the task of purchasing—and with it, the co-ordination of purchases—to the countries' trade organisations, i.e., Shell-Mex House and the Société pour l'Importation des Pétroles et Dérivés. On the other hand, the scope of the Anglo-French Oil Executive was not confined to merely supervising the procurement of oil; it also kept watch on the supply of oil to neutral and enemy States, becoming, in effect, responsible for the conduct of this important branch of economic warfare. An important task in this field was the co-ordination of measures to divert the output of the Roumanian oilfields away from enemy hands.

But undoubtedly the most urgent of the tasks which faced the new Anglo-French Oil Executive arose from its responsibility for the formulation of joint import programmes. During the early difficult months, import schedules were necessarily governed by the amount of shipping that was likely to be available. In order to make the best use of tankers under these conditions it was necessary for the Shipping Executive to distribute the burden of shortage between the two countries according to the relative priority of their needs: this question of priority it was the duty of the Anglo-French Oil Executive to decide.

Justice on this point was vital to the well-being of the alliance; and, taking the period as a whole, it looks as if justice was done. If the balance can be held to have tilted at all, it tilted in favour of the French. The movement of civil stocks, which bore the brunt of the burden in both countries, may be used as a means of comparison. During the first six months of the war, the United Kingdom civil oil stocks declined by nearly 25 per cent.; France lost only 15 per cent. of hers. During March and April 1940, when the supply position

<sup>1</sup> See p 123.

was improving, French civil stocks rose by some 300,000 tons; those in Britain by only 200,000 tons.

But in questions of allocation between war-time Allies it is almost as important to give the appearance of justice, as to secure justice itself. It was unfortunate that for the greater part of the time the British and French found it impossible to arrive at any decision on the division of oil and tankers whose fairness was beyond dispute. This was due to an absence of required statistical data. Without full details of the movements of stock levels and the rate at which the various oil products were being consumed in the two countries, it was impossible for the joint Oil Executive to appraise the relative urgency of British and French needs. When the Executive made a decision it was equally impossible, without full knowledge of both actual and proposed movements of all the tankers working in Allied service, for the Anglo-French Shipping Executive to share out their tonnage resources in a way which was demonstrably just and efficient. Down to the end of April 1940 neither the British nor the French were able to produce adequate tanker statistics. The British were at least able to produce full information about their oil stocks and consumption; the French statistics even here were scanty and usually incomplete.

To some extent statistical shortcomings on the French side were simply due to shortage of staff.<sup>1</sup> In the main, however, inadequacy of statistics arose from the nature of French war controls, which apparently were not well adapted to function as part of an inter-Allied system based on the principle of a pooling of resources. In contrast to the unified and comprehensive control which had been set up in Britain, French control machinery was limited in scope and divided between separate authorities. In particular, oil liaison between the Service and civil authorities was very imperfect. The French civilian oil department ('Direction des Carburants') had no knowledge of the level of Service stocks in France, nor of deliveries to the French Armed Forces. Details of civil supplies were also less readily available in France than in Britain for, unlike Shell-Mex House, the Société pour l'Importation des Pétroles et Dérivés was not involved in oil distribution within the country. Information about stock levels, as well as the refinery production which furnished the greater part of France's supplies, had to be sought from the individual companies. On the shipping side French administrative control was also incomplete. Approximately one-third of French crude oil imports were supplied to her Government under c.i.f. contracts, and were carried in tankers whose movements, being solely under the control of the supplying oil companies, fell outside

<sup>1</sup> However, in regard to coal, the French were said to have a 'most refined and accurate statistical system'.

the purview of the French authorities. As a result it was not until March 1940 that the Anglo-French Shipping Executive was furnished with a loading programme which took account of all vessels carrying oil to France. The Anglo-French Oil Executive, for its part, received for the first eight months only the figures of current French imports, and monthly levels of civil stocks; and even these could not be regarded as absolutely reliable. It was not until April 1940, four months later than the British, that the French were able to bring out their first programme of oil requirements; it was not until May that they were able to produce a set of tables on which the Anglo-French Oil Executive could base a fair assessment of their current needs.

These failings on the statistical side were a crucial factor in relations between the British and French oil authorities. Without any criterion of relative need, it was impossible to co-ordinate demands. As a result the allocation of tankers, instead of being based on decisions arrived at in common, proceeded blindly by means of a monthly bargaining process which provided fertile ground for controversy. The situation was not made any easier by the huge disparity between the tanker resources of the two countries,<sup>1</sup> a disparity which led their representatives to approach the question of allocation from radically different standpoints. Whereas the British, who controlled the bulk of the tonnage, were naturally annoyed at the inability of the French to provide statistical backing for their demands, the French, on their side, resented the dependence in which they found themselves—a dependence which controversy made them more keenly aware of.

It was not surprising in these circumstances that each partner should suspect the other of bearing less than a fair share of the burden. The French, having reduced their tonnage demands to what they thought would be available, protested strongly when they were compelled by shortage of tankers to submit to further cuts.<sup>2</sup> The British, for their part, pointed to examples of inefficient use of those tankers already under French control. Moreover, as the months went by, the British began to suspect that French estimates of oil requirements were much too high—as indeed their own estimates for Britain had proved to be. However, the level of imports into Britain was always higher than the level of imports into France; and as the shipping position grew easier in the spring, the gap between the two tended to widen. This led the French to suspect that they were getting less than their share of the Norwegian tonnage that was coming over to the Allies. French resentment was not lessened by reflecting that, but for a concession to British pressure before the war, their dependence on British goodwill might have been much

<sup>1</sup> See Table 15, p. 243.

<sup>2</sup> Down to December 1939 the French were given all the tankers that they asked for.

less complete. Originally the French had proposed that neutral tonnage should be decided on a long-term basis between the two countries; this principle, if accepted, would have gone some way towards redressing the balance of resources. In the interests of efficiency, however, the British had held out for the system of allocation by voyages, which was ultimately adopted. The result was that the British, who undertook the chartering of the vessels, also kept them under their own management, and the disparity in respective tanker strengths of the two countries, instead of being redressed, was augmented. The French, in giving way to the British, had assumed that there would be plenty of tankers available; and with the disappointment of this hope they pressed earnestly for the war-time system of allocation to be revised.

These differences over allocation of tanker tonnage unfortunately made it more difficult to discuss wider differences of policy between the two countries in a balanced and unprejudiced way. Conspicuous among these differences was a dispute over the development of oil resources in Iraq. Early in 1940 the French, whose only important oil investment was in the Iraq Petroleum Company, strongly pressed the merits of a scheme to expand oil production in Iraq, doubling the amount of oil the Allies could procure from this source. Since oil supplies from Iraq were shipped from Mediterranean ports the value of this scheme evidently depended on the Mediterranean remaining open to Allied shipping. The British, who did not think that this condition could be fulfilled much longer, resisted the French suggestion. This was an issue on which the joint Oil Executive might have been expected to produce an agreed recommendation; yet in April 1940, after prolonged discussion, it had to be referred to the joint Co-ordinating Committee and ultimately to the Supreme War Council.

Another important conflict of views arose over French refining policy, an issue which was intimately bound up with the question of tonnage allocation. During the 'thirties the French government, anxious to relieve the burden of its dependence on foreign suppliers, had striven with some success to promote the growth of a refining industry in France; by 1939 the throughput capacity of the French home refineries had reached nearly 8 million tons a year, and the French government naturally proposed to continue operating these plants in war-time. To the British, whose own home refining was on a much smaller scale, it seemed that this French policy involved an extravagance in the use of tanker space which was hard to justify in a period of shortages: allowing for refinery losses and for the fact that some products would have to be produced in excess of requirements, it meant that the French would have to import, all told, about 11½ million tons of oil, during the first year of war, to meet a

demand estimated at only about 9½ million. The French,<sup>1</sup> however, were naturally reluctant to allow a well-established industry, which they had fostered with such care, to become the first casualty of a shipping shortage for which they regarded the British as responsible. In January 1940 the French agreed, purely as an exceptional measure, to reduce the scale of their refinery operations for two months in order to ease the immediate pressure on stock levels. But in general their reaction was to call on the British shipping authorities to fulfil the promises they had made before the war. In any case, as they did not fail to point out, French policy was less extravagant than appeared at first sight. In the first place, some 40 per cent. of French 'crude' imports were from Iraq and could be lifted from ports in the east Mediterranean: it required little, if any, more tanker space to carry Iraqi crude to the south of France from these two Mediterranean ports than to bring refined products from more distant parts of the world. On the other hand, much of the crude oil from these more distant sources was needed to maintain French output of aviation spirit and high quality lubricating oil, which both sides agreed was a necessary part of their supply plans.

The British conceded the force of French arguments; but their opposition did not weaken. Indeed, it soon began to appear that the shortage of tanker space had been a convenient occasion for attacking a policy they disapproved of for other reasons; even when tanker prospects improved in the spring of 1940 the British kept up their criticism of French home refining. But now they began to use new arguments. The British pointed to the ease with which the French refineries could be attacked from the air, a point urged, it will be recalled, by the Falmouth Committee against the construction of synthetic oil plants in Britain before the war. The British also argued that French home refining was a hindrance to full Allied integration since it made more difficult the exchange of oil stocks and cargoes between the two countries at short notice. These were all objections which had been equally valid before the war and the British had not thought to raise them then. It was the early tanker shortage, and the allocation problems arising with it, which brought the home refining issue squarely before them and fanned a latent disapproval into open hostility.

The merits of these arguments are not easy to determine;<sup>2</sup> and

<sup>1</sup> Notably Colonel Pineau, Chairman of the Oil Executive, who had been the architect of the French home refining policy.

<sup>2</sup> To assess the merits of the French case, it would be necessary to ascertain how much avoidable waste of shipping was involved in the French programme, and then weigh this against a variety of possible compensating advantages, such as dollar saving or greater productive flexibility, as well as counterbalancing disadvantages such as the accumulation of unwanted residual oil products overseas. The material is not available for such an assessment.



they need not detain us here. Differences of some kind were probably inevitable; they were an expression of the distinct national identities of the two countries. The true measure of partnership between nations is not the number of disagreements between them, but the ease with which such differences can be resolved or reconciled. Yet even by this milder criterion, those early months make up an unimpressive chapter. Mainly because of the tanker shortage, the two sides were confronted with divergencies of interest which could only be resolved through positive goodwill founded on trust. Owing to the slightness of their pre-war contacts this was not present when war broke out and it had little chance to develop in the difficult period which immediately followed.

But it would be misleading to take leave of this account of Anglo-French oil relations on a note of failure and frustration. The creation of the Executives had been a definite step forward. Had they been able to function for a longer period, with a drive for closer co-operation and integration emanating from the Anglo-French Co-ordinating Committee at the top, these bodies could have acted as a forcing-house for the growth of closer relations between the two countries. In any case, the administrative difficulties that have been described were only the teething pains of partnership: like the tanker shortage itself they were being rapidly overcome. By May 1940, the French were producing complete and satisfactory tables of statistics, while the British had accepted the principle of direct French control over a number of neutral tankers. Early that month a sub-committee of the Anglo-French Shipping Committee allocated ten Norwegian tankers on time-charter to the French Sea Transport Mission. With routine frictions overcome the road was open for developing a more harmonious relationship.

One month later, however, the successful German invasion of France swept away the whole functionally-integrated structure of co-operation. Another eighteen months were to pass before the British could try their hand again at collaborating with a major ally in war.

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### PART III

## Hot War

### Summer 1940—Autumn 1941

## CHAPTER V

# THE PRICE OF DEFEAT

(i)

### Tankers from Europe

**I**N the spring of 1940 the calm in Western Europe was shattered. On 9th April the Germans launched their attack on Denmark and Norway; one month later, on 10th May, they invaded the Low Countries. Events then moved swiftly. By the end of May the Dutch and Belgian forces had surrendered and the evacuation of Allied troops from Dunkirk was under way. On 10th June Italy joined in the war at Germany's side. Finally, on 22nd June, the partnership between London and Paris terminated when a new French government accepted German terms for an armistice.

In the space of two and a half months, Britain had suffered a defeat whose implications were far more than military. The pre-war plans had become irrelevant since the assumptions they were based on had ceased to be valid. Oil supply now had to be arranged under conditions much more favourable to the attacker than contemplated before the war. From newly-won airfields in North-West Europe German aircraft could range the length and breadth of Britain and British coastal waters. They could outflank the main belt of anti-aircraft defences which, it had been hoped, would give some protection to the oil ports and refineries in the western half of the island. From bases on the Bay of Biscay, German submarines could now launch a more powerful and sustained assault on the shipping bringing supplies to this country; and British power to resist the U-boats in this area was weaker. The Navy, bereft of French naval assistance, now had to divert warships from convoy duty to maintain a naval shield against invasion; because of Italy's entry into the war warships were also required for convoy duty east of Suez.

But one immediate result of Germany's invasion of the European neutrals in the spring of 1940 was the reverse of unfavourable: for it led to an increase in the number of tankers under British governmental control. There were of course patriotic reasons why tankers registered in the invaded countries whose governments had decided

to resist, should then take service with the British. There was also an economic incentive. The over-running of western Europe reduced world outlets for tanker services. Many of these tankers had to work for the British or not work at all.

During May and June 1940 the British government strove as a matter of policy to get all the tankers it could under permanent control. The Danish government was controlled by the Germans and could not be negotiated with. The British therefore seized in prize all the Danish tankers they could lay their hands on. The same policy was adopted later towards French tankers. With the other invaded countries, and with Sweden, Shipping Agreements were concluded. The Agreement with still-neutral Sweden, signed in May 1940, made no definite commitments. Under it the Swedes promised to charter to the Ministry of Shipping any tankers they did not need themselves, and which had not been time-chartered to anyone else. The British promised to employ these tankers as far as possible outside waters particularly exposed to war risks. The governments of the new Allies were naturally more forthcoming. During April and May the Norwegians time-chartered to the Allies another eight tankers which had lost their employment. A second Norwegian Agreement signed on 20th June, confirmed these arrangements and offered sixteen more for delivery by the end of October. Negotiations with the Dutch government led, in May, to all but a small part of the Dutch ocean-going fleet—totalling about half a million deadweight tons in all—being placed under British control. Some 85,000 deadweight tons of this was time-chartered to the Ministry of Shipping. The remainder, consisting of the ocean-going tanker fleet owned on Dutch registry by the Royal Dutch/Shell Group, was left unchartered; but it was agreed that from the beginning of July its movements should be subject to British licensing control. The last of the series of Agreements was concluded with the Belgian government on 20th July and was intended to give Britain control over 100,000 deadweight tons of tankers on Belgian registry. Now that Britain no longer had to consider French oil needs there was no longer an urgent need for these tankers. Accordingly, the Agreement provided that the Belgian tankers should stay temporarily under Belgian government control on the understanding that they would only be used in trades acceptable to the British, and that the British government could take them on time-charter when it saw fit.

What was the effect of these arrangements on British tanker strength? Between the beginning of May and the end of August 1940 the amount of tanker tonnage under British control rose by not far short of a million deadweight tons to a total of about 6.9 million deadweight tons including some 1.9 million deadweight tons of Norwegian and nearly half a million tons of Dutch tankers. At the

outbreak of war the British-controlled tanker fleet had been roughly 5.3 million deadweight tons, including over half a million deadweight tons of Norwegians.<sup>1</sup> Table 5 below shows how this increase came about.

TABLE 5  
Additions to British-controlled Tanker Fleet  
May–August 1940

	Gross gains*				Net gains†
	Total	Norwegian tonnage	Dutch tonnage	Other‡ tonnage	Total
May	297	196	11	90§	266
June	219	123	48	48	85
July	619	188	348	83¶	528
August	153	80	73	—	79

\* Tankers taken in prize or requisitioned, time-chartered or subjected to British licensing control.

† After subtracting losses due to sinking, or detention by the enemy and the Vichy French.

‡ Includes Danish, French, American, Panamanian and Swedish-flag tankers.

§ Includes two Swedish tankers covered by the Shipping Agreement with Sweden, one American tanker purchased and one Danish tanker transferred to South African registry.

|| Includes two Norwegian-owned Panamanian-flag tankers taken on time-charter and one American tanker purchased.

¶ Includes one Norwegian-owned Panamanian-flag tanker taken on time-charter.

How far did this increase in the number of tankers under British control represent a genuine accretion of shipping strength; and to what extent did it come about as a result of the military events in Europe? Many of the ex-neutrals brought under Ministry of Shipping control as a result of the Agreements had already been giving at least intermittent service in Allied trades before the German invasions took place; for instance, a count taken early in 1940 showed thirty Dutch tankers of 324,000 deadweight tons working in Allied trades.<sup>2</sup>

<sup>1</sup> Thirty-eight Norwegian tankers on time-charter to British oil companies, and two-thirds of the tonnage of eleven 'Montreal' Norwegians. Totals of tanker tonnage vary according to whether all vessels above 1,600 gross tons are included, or only vessels of 4,000 gross tons and over. Strictly speaking most vessels below 4,000 gross tons were not 'ocean-going'. They were specially designed to operate in local trades in shallow waters. But some could be and were used on ocean voyages. The figures also depend on whether or not vessels used as storage hulks, and vessels built exclusively for fleet attendance work are included. Most of the latter did some freighting for the Admiralty now and again. In view of all these factors it is not worth calculating the size of the tanker fleet to within 100,000 deadweight tons either way simply to illustrate the broad general trend.

<sup>2</sup> Twenty-three of these were owned by Shell. Most of the remainder of the Shell fleet was trading to Holland and the Dutch colonies.

Moreover many of the Norwegians acquired had already been be-spoken for Allied use before the German assault began. The fact was that the shortage of the early war months had been largely due to transitional factors which were already ceasing to influence events when the Germans launched their attack on Norway and Denmark. Tankers were then becoming easier to acquire and the German action simply speeded up and extended this trend.

Nevertheless Germany's attack on the European neutrals may have strengthened Britain's position in a number of crucial respects. Had the neutrality of Norway and Holland in particular, been respected, as in the First World War, it is conceivable that the governments of those two small States might have found it difficult, after the fall of France, to resist German pressure against allowing their tankers to sail to the United Kingdom. Such a restriction could well have been decisive in 1941 when all the tankers, and crews, of these new Allies were to seem too few for the needs of the hour.<sup>1</sup>

Meanwhile these summer months of 1940 formed a unique inter-lude in the history of war-time oil supply; a period when tankers were in surplus. At the end of July the Oil Control Board's new Executive Committee, making its first forward survey of supply prospects, reported that Britain had at her command, to meet Empire requirements over the next twelve months, an excess of tanker tonnage equivalent to thirty-six 'notional' tankers (that is, tankers capable of carrying 10,000 tons of cargo each); and this despite the fact that the tanker-saving short-cut through the Mediterranean was no longer open. The size of the surplus was due to the fact that there was no longer any need to provide tankers for the French. But there would have been a surplus in any case, according to calculations made by the Executive Committee while the French were still in the war.

<sup>1</sup> An indication of what might have happened if Norway and Holland had remained neutral after the fall of France is provided by experience of the working of the Agreement of 16th May with Sweden. The Germans refused to allow any tankers to leave the Baltic unless they undertook not to work for the British. This meant that of the nineteen Swedish tankers only the seven then outside the Baltic were potentially available. Of these four were said to be tied up in neutral service although London had its suspicions of this. One, the *St. Gobain*, was on time-charter to a French company, leaving two, the *Saturnus* and the *Pegasus*, available for British service. The crews of both these vessels refused to sail for Britain. The *Pegasus* was therefore used in the Eastern cross-trades and remained in Allied service until she was sunk in July 1943. The *Saturnus* never came into British service at all. She, and two of the other four outside the Baltic, were requisitioned by the Swedish government. *Saturnus* was 'replaced' by the *St. Gobain* which was made available on a single-voyage basis, but in fact remained continuously in Allied service from late 1940. Of course the geographical position of the Swedes made it easier for them to plead *force majeure*, and Swedish vessels had less incentive to work for the Allies than most of the Dutch tankers (which were owned by Royal Dutch/Shell) or the small Norwegian shipowners.

(ii)

## Threat of Invasion

As a result of the German advance on the Continent, the gravest threat facing the British in mid-1940 was that of invasion. The Government began preparations to meet this threat even before the surrender of France.

One possible consequence of invasion—or, for that matter, of heavy air bombardment—namely a breakdown of communications, was already prepared for before the German advance. The system of civil defence regions has already been mentioned.<sup>1</sup> Each was headed by a Regional Commissioner who was to take over complete control if his region were cut off from London. Assisting and advising Regional Commissioners were officers representing different Government departments, including the Regional Petroleum Officers whose normal function was to administer petrol rationing. The Regional Petroleum Officers had the responsibility, in emergency, of ensuring that all essential users within their regions received adequate supplies of all petroleum products. They were in close touch with the Regional Managers of Shell-Mex House who co-ordinated the work of local distribution and whose regions had been made coterminous as far as efficiency permitted, with the civil defence regions.

During an invasion oil would not only have to be supplied to British users; it would also, at all costs, have to be kept from the invader. This was the plain lesson of the fighting in France where the German army had used captured stocks of motor fuel to maintain the momentum of its advance. In Britain the Germans would be even more dependent than in France on captured fuel, for their supply lines across the Channel would be that much more precarious.

The obvious steps seemed to be to remove all oil stocks from the areas most exposed to invasion and to provide army protection for stocks in other parts of the country. But by the late spring of 1940 oil storage in the safer western half of the country was already nearly full, and it was therefore out of the question to evacuate all stocks from the exposed east and south. In any case there were tactical objections to such a policy. If cross-country supplies were interrupted, as they might well be during invasion, the defending forces might be fatally hampered by the absence of local stocks.

Therefore the policy adopted was to provide anti-aircraft and ground defences for refineries and storage points throughout the

<sup>1</sup> See p. 86.

country. On 8th June 1940 an Inspectorate of Oil Protection was formed to supervise and co-ordinate this programme. Major-General Sir Andrew McCulloch was appointed as Inspector on 18th June and attached to the Petroleum Department. During the critical months which followed, barbed-wire defences and other obstacles were erected around the oil installations, and members of the Home Guard, as well as small detachments of the Regular Forces, were sent to man them. By the autumn of 1940 all the principal oil plants and depots had been thus protected. However, it was impossible to provide enough troops to guarantee the security of stocks against very small-scale raiding parties since the Army Command was not prepared to fritter away its strength among numerous scattered defence points. Even twelve months later vulnerability to such raids was still worrying the oil authorities.

But it was not the great installations at the ports, but the thousands of petrol-filling stations and consumers' bulk storages up and down the countryside which were the greatest cause of anxiety. These stocks, small though they were, would be of immense value to enemy spearheads or raiding parties which might infiltrate or be air-dropped to the rear of defending forces. Accordingly it was decided to reduce the number of such supply points drastically in vulnerable eastern parts of the country. On 1st June 1940 the Secretary for Petroleum assumed powers to grant or withhold licences for the storage of products which could be used as fuel or lubricants for motor vehicles.<sup>1</sup> He used these powers that June to close down about 17,000 'filling stations' and commercial stores in east and south-east England. The displaced stocks were concentrated at some 2,000 approved sites, which could be more easily guarded. At the same time Shell-Mex House undertook to reduce the number of its inland distribution depots in use in the area. All this was put in hand before the fall of France. Later, the same precautions were taken in the coastal areas of south-west England and east Scotland.

These were the arrangements for defending oil stocks. At the same time plans were drawn up to destroy them if the oil could be used for motor fuel and if it looked likely they were to be overrun. The main problem here was to decide *who* should give the order for destruction. Experience on the Continent had shown that there was a very real danger that instructions from the centre might not get through when the time came for action. On the other hand there were objections to entrusting the decision to a local commander. Civil and military authorities agreed that the destruction of thousands of tons of fuel was not to be undertaken precipitately; to do so would be to weaken Britain's resources, and play into the enemy's hands. The

<sup>1</sup> Petroleum (No. 3) Order, 1940 (S.R. & O. 1940 No. 962).

order to destroy should only be given if it were clear beyond all doubt, not only that the stocks were going to fall into possession of the invader, but that they were unlikely to be recovered. A local commander could not know this.

It was therefore decided to accept the risk that large stocks of oil might be captured intact. It was argued that they could subsequently be destroyed by gunfire or air attack if it should not prove possible to recapture them. On 27th June the Oil Control Board ruled that only the Commander-in-Chief, Home Forces, could order the destruction of stocks at major installations. However, local commanders were empowered to order that pumping equipment at threatened storage points should be put out of action. This would ensure that the enemy was denied his immediate battle requirements during the vital few days before a counter-attack could be staged.

These arrangements remained in force until April 1941 when a report of growing German armoured strength made the Army decide that the risk of leaving large stocks in enemy hands could no longer be accepted. The power to destroy major stocks in an invasion area was then given to corps commanders, except in the Thames Estuary, where installations could be destroyed only on instructions of G.O.C. Command.

(iii)

### Attack from the Air

Britain was spared the wholesale devastation which certainly would have followed a landing by enemy forces. But during the critical year which ensued between the collapse of France and the invasion of the Soviet Union, Britain was heavily bombed from the air. Her oil storage at times came under sustained attack.

This new phase of the war began late in June 1940 with scattered air raids over north-east England; these did little damage, but led to some loss of production at the Billingham plant because work was halted during the alerts. As the summer wore on the air attacks became heavier and more widespread. As expected, the greatest weight of bombs was dropped on the east coast refineries and installations. In September, as part of their offensive against the port of London, the Germans launched a sustained assault on oil storage in the Thames Estuary. Each of the larger installations there was attacked six or seven times in the course of that month. But the west coast oil ports were not spared either; in fact, between June and September, most of the raids on oil targets were directed against storage in

south Wales and south-west England. A raid in August on a large naval installation at Llanreath caused a fire which burned for twelve days and destroyed nearly 100,000 tons of oil. Early in September there was heavy loss at Llandarcy in a fire which temporarily closed the oil port of Swansea to tankers. Later, during the great raids on Plymouth—the night of 28th November, and on Clydeside the night of 13th March 1941—naval oil stocks suffered severely. Indeed, the greater part of the oil lost through air raids down to the middle of 1941 was destroyed in the western half of the country.

By pre-war standards Britain was still ill-prepared in the middle of 1940 to withstand enemy air attack on her oil facilities. It will be recalled that the Oil Board had drawn up its plans on the basis that all the major installations on the coast—from the Tyne round to Southampton—would have to be ruled out in the event of full-scale air attack. But it was believed that the storage along the west coast, although certainly not secure, would be less vulnerable because it would be behind the line of anti-aircraft gun and fighter defences. The German advance to the Atlantic, however, had turned the flank of these defences. There was now no reason for regarding the west coast facilities as any less vulnerable than those in the east. On the other hand, since the outbreak of war most of the big commercial installations had been camouflaged (save only those in the Thames Estuary, where attempts at disguise were considered futile); and the programme for the construction of 'bunds' round the outside of installations had been completed.<sup>1</sup> But the effectiveness of camouflage was limited by the highly distinctive shadows cast by oil storage tanks. As for the external 'bunds', these were intended to protect neighbouring property rather than the installation itself.

Thus, on pre-war criteria, the only stocks that could be considered even 'relatively' secure after mid-1940 were those held in underground or 'partly buried' tankage. Yet even if the full pre-war programme for building 'protected' storage had been carried out, this storage would have formed only a small part of the total stocks Britain needed to hold. In fact the 'protected' storage programme was nowhere near completion in mid-1940: the building had started late and fallen still further behind after war broke out. The black-out, which made night work impossible, and the cold winter of 1939-40, had greatly reduced the efficiency of labour in the opening months of the war; and shortages of labour and materials began to appear as the weeks went on. Soon after the war began it was decided not to continue with schemes which could not be completed by the end of

<sup>1</sup> In May 1940 the Oil Control Board was told that 88 per cent. of the external bunding programme had been completed and another 6 per cent. was more than half finished. 137 installations had been camouflaged by disruptive painting.

1940. Even so the programme to build protected storage fell more and more behind schedule.

In the end it was the Air Ministry which came off best. They had been furthest forward in September 1939 with one-third of their original storage programme already completed; by September 1940 they had completed just under 90 per cent. of their pre-war schemes, including the whole of the more heavily protected storage at their forward distribution depots.<sup>1</sup> But it took another twelve months to finish the remaining 10 per cent., by which time the worst of the air raids were over. It took just as long to complete the schemes for building protected civil storage. Only about 60 per cent. of the oil companies' programme, and about half of that of the Government, had been carried out by the autumn of 1940.<sup>2</sup> Together this amounted to much less than half the total of protected civil storage originally contemplated; and only about one-seventeenth of the total civil storage in the country. The War Office schemes were also behind-hand. As for the vast underground storage building programme which the Admiralty had embarked on, this was still only half finished as late as the end of 1941; it was to be 1943 before it was completed.

This was not a satisfactory record. But it was favourable indeed when compared with the progress of schemes to reduce the vulnerability of approaches to tanker berths at west coast oil ports. It will be recalled that, in the spring of 1939, the Committee of Imperial Defence had authorised the construction of new tanker jetties outside the main dock systems at Avonmouth and Swansea to ensure that oil supplies could continue to flow through these ports even if access to the docks were blocked by bombing. In September 1939 these jetty projects had been still in the planning stage. They advanced little further during the next nine months. The delay was largely administrative. Weeks slipped by while arguments went on about who was to pay how much, and for what. In March 1940, after six months negotiation, the Great Western Railway Company, which was the Swansea port authority, agreed to bear part of the cost of a new jetty at Swansea. But it was then discovered, rather late in the day, that for various technical reasons the jetty could not be built at all. The project was therefore abandoned in favour of a scheme to convert Port Talbot, a few miles up the coast, into an emergency oil port and to lay down pipelines connecting Port Talbot with the storage at Llandarcy. Special moorings were to be provided at

<sup>1</sup> 269,000 tons of storage was completed at the end of September 1939, and 696,000 tons by 8th September 1940.

<sup>2</sup> About 190,000 tons out of the companies' modified schemes to construct 322,000 tons was complete or almost complete in September 1940. About 144,000 tons out of 276,000 tons being built by the Government to house the civil reserve was completed by October 1940.

Milford Haven where large ocean tankers which could not be handled at Port Talbot, could, in emergency, discharge into smaller vessels. The Government agreed to bear costs of this Port Talbot scheme which had no foreseeable commercial value.

This was an unhappy enough story. But at least, when work began in June 1940, the worst was over. The Port Talbot project, carried out by the Anglo-Iranian Oil Company under supervision of the Petroleum Department, was finished by October 1941. At Avonmouth on the other hand, work on the site did not begin until August 1940 and then went ahead at a snail's pace. The exceptional tidal conditions gave rise to difficult engineering problems. But these were only partly to blame. At the start progress was held up by lack of equipment; then the contractors soon encountered the full effects of shortages of labour and materials, which began to grow very severe during the second winter of the war. The work fell still further behind schedule.

The handling of the original Swansea scheme and the Avonmouth scheme was strongly criticised in mid-1940 by both Shell-Mex House and the Petroleum Department. 'A woeful example of the way not to do things', wrote Sir Andrew Agnew in June 1940. The criticism was valid and the rebuke was deserved. There was undoubtedly a lack of drive from the centre, which may have been due to the fact that the execution of the schemes could not be entrusted to the authorities most deeply concerned with them. Both the planning and execution were in the hands of the Ministry of Transport (as the Ministry responsible for port and transit facilities) and the respective port authorities, who were called upon to pay part of the costs. None of these bodies had any special knowledge of, or concern with, the problems of oil distribution. Meanwhile the Petroleum Department, where the schemes had originated, was powerless to do more than urge the Ministry of Transport to speed up the rate of progress.

In the event, mainly because of delays in getting started, none of the pre-war schemes to mitigate the effects of air attack had been completed by the time the German raids began; and this despite the unexpected breathing-space the country had been afforded. Indeed, none of the schemes had been completed before the worst phase of the bombing was over.

Fortunately the failings did not prove as grave a matter as the pre-war planners had been led to expect. The total loss and damage inflicted on United Kingdom oil stocks and facilities down to June 1941, when the air attacks died away, was not only less than anticipated; it was remarkably little by any standards and had no significant effect on the general oil position. None of the United Kingdom refineries, counted so vulnerable by the pre-war Falmouth Com-

mittee,<sup>1</sup> suffered serious injury. Losses of stocks were almost negligible; only about 7 per cent. of naval stocks and 3 per cent. of civil stocks were lost in Britain by enemy action between July 1940 and June 1941.<sup>2</sup> The Army and Royal Air Force lost no stocks at all. Nor were imports seriously interrupted through damage to berthing facilities or ocean storage. Losses of storage capacity were higher than losses of stocks, some tanks being destroyed when empty. Even so, only about 5 per cent. of the total storage tankage in the United Kingdom was lost through enemy bombing.<sup>3</sup> In view of the large surplus of storage capacity with which the country had started the war, this loss was insignificant; the more so because the greater part of these losses were sustained in the east of the country and, from the middle of 1940, the greater part of the country's oil traffic was handled at west coast port installations.<sup>4</sup>

The smallness of these losses makes a striking contrast with the assumptions on which pre-war planning had been based. What were the reasons for the discrepancy? Partly it was due to the diversion of the German air assault against other kinds of target. Many of the biggest losses of oil were the outcome of sporadic raids of the 'intruder' type; except during September 1940, when the Thames Estuary was under fire, the Germans never launched the kind of full-scale planned assault against British oil facilities which they themselves were to endure in the years to come. During the many later raids on the London area, oil targets received for the most part only incidental attention; the same was broadly true of the raids on other large ports and industrial centres.

But the main reason why losses were not more serious was that bombing from aircraft proved surprisingly ineffective as a method of destruction. Experience on Thameside soon showed that, at the stage of development which it had reached in 1940, air bombing was far less accurate and devastating than had been believed before the war. It was true that only deep underground storage was quite secure against direct hits from high explosive bombs. But the number of direct hits in any case was small. For example, no less than thirty-nine high explosive bombs were dropped on the oil installation at Coryton the night of 5th September without doing damage to any vital part. This storage, admittedly, was of modern design, with particularly well-spaced tanks. But there were numerous other

<sup>1</sup> See p. 23.

<sup>2</sup> Taking as a basis the stock level at the end of July 1940. About 150,000 tons of Admiralty fuel and 124,000 tons of other products were lost between July 1940 and June 1941. Losses during the war amounted to about 0.35 per cent of war consumption.

<sup>3</sup> Civil and Admiralty losses amounted to about half a million tons of tankage by 31st July 1941. In August 1940 storage capacity, excluding Admiralty storage, was 6½ million tons, so that total storage must have been about 10 million tons.

<sup>4</sup> These figures do not however take account of storage that was damaged and later repaired, details of which are not available.

examples of raids in which most of the bombs fell on open ground in the target area. Thus, after eight raids on Purfleet and seven on Shell Haven, no damage to tanks was reported. Most of the damage caused by high explosive bombs did not come from direct hits but from near misses. It was not the tanks, but ancillary fittings such as pipelines, that were more vulnerable to blast and splinters, which suffered most in this way.

Attacks with incendiary bombs were even less effective than attacks with high explosive bombs. An unexpected feature of the assaults with high explosive bombs had been the rareness with which fires were started; only thirty-four were reported from some 130 separate attacks. Incendiary bombs proved even less efficient as fire-raisers. Incendiaries could not be accurately aimed and the proportion of hits was lower than in raids with high explosives. By the end of 1941, only about 350 instances of hits by incendiaries on tankage had been recorded throughout the country; this should be compared with an estimated 2,000 incendiary bombs dropped on Thames Haven during a single night. Moreover even when they did hit the target, the incendiary bombs usually did little damage. Only about one in ten succeeded in penetrating the unprotected roofs of the surface tanks, and even then, more often than not, owing to the absence of vapour, they failed to ignite the oil and sank harmlessly to the bottom. Only about five serious oil fires were caused by incendiary bombs throughout this period. It was the administrative buildings and barrel stores attached to oil installations that suffered most from fire.

When all this has been said, it is none the less true that an important part in keeping losses down was played by defensive measures introduced after the air raids had actually begun. Here, the British were able to profit from French experience during the campaign of 1940. Before the war the French had followed a protection policy entirely different from the British. Instead of building buried or underground storage they concentrated on erecting splinter-proof concrete walls about fifteen inches thick round each tank, at a distance of about three feet from its sides. This construction proved remarkably effective, since most danger to tankage from high explosive bombs arose not from the very infrequent direct hits, but from hot splinters from bombs which narrowly missed the target. These splinters penetrated the sides of the tanks, setting the oil inside on fire and also allowing it to escape into the surrounding compound.

In the middle of May 1940, before the first bombs fell on British oil storage, the Secretary for Petroleum was urging the oil companies in Britain to follow the French example and adopt similar lateral protection. Their initial response was lukewarm. The Government was not deterred, however. On 7th June the Oil Control Board approved a programme for the erection of protective brick walls

around some half a million tons of Air Ministry and War Office petrol storage tanks in the west of England. By the end of June, proposals to build walls round 600,000 tons of storage, mostly in the south-east of the country, had already been put forward. As with the programmes for 'buried' storage the Government undertook to bear half the cost of work at commercial installations.

The first enemy raids, which showed the havoc that hot splinters could cause, completely converted the oil companies to the idea of lateral protection. During the autumn and winter of 1940 the construction of walls round petrol and paraffin storage went ahead quickly. Moreover since (against all expectations) the worst losses from splinters during the early raids had been among stocks of heavy oil products, it was decided to build walls around their storage as well. On 21st August 1940, the Oil Control Board agreed that lateral protection should be given to all civil tankage above ground, although petrol storage was still given priority. In October the Admiralty decided also to protect storage in the same way.

By the end of 1941 eleven separate lateral protection programmes were under way, taking in ever-widening categories of tankage; eventually even the small coastal and inland depots, and tankage belonging to 'independent' storage companies which had not been merged into the Petroleum Board, were equipped with splinter-proof walls. In all, the non-naval programme alone took in more than 4½ million tons of storage. Nor was it only the sides of the tanks that were protected; pipelines within the installation were also given protection by being relaid below ground surface.

The speed with which these programmes were pushed through stands out in favourable contrast to the slow handling of schemes for new tanker berths. By the end of 1940 over 2 million tons of tankage capacity had been provided with surrounding walls. The value of the walls was proven time and time again. One spectacular instance may be singled out. During the great raid on Clydeside in March 1941, eleven large unwallled tanks were set on fire, but adjoining wallled storage remained unharmed. So impressed were the authorities that at the beginning of 1941 they seriously considered replacing any tanks destroyed in air raids by laterally-protected surface storage.

The need for lateral protection of oil tanks had been one lesson of the early raids. Another was the need to improve fire control methods within depots and installations. In September 1940 the Secretary for Petroleum called a conference of Home Office, Admiralty and Shell-Mex House representatives to review the experience of the previous weeks. In the following weeks an inspection was made of fire-fighting facilities at every oil installation in the country. There was general agreement that air foam was the best extinguisher and should be the main weapon used. A problem revealed by experience was that



sometimes the roof of a fired tank remained intact so that it was difficult to apply the foam to the burning oil inside. As a consequence permanent inlets were installed near the tops of the tanks through which foam could be introduced. Another improvement suggested by experience was the filling of empty tanks with water which could be used if the water mains were breached. Co-operation with the Fire Service was also improved; this had not always been good during the early air raids. Now fire brigades were issued with special instructions telling them the best ways to fight oil fires, and defining the boundaries of responsibility between fire brigade officers and oil company staff. Fire brigade officers began to tour oil installations in their area and to collaborate with the staff in drawing up fire-fighting plans.

A particularly urgent task in the late summer of 1940 was to reduce the chances of fire spreading from tank to tank within an installation. Many of the worst losses during July and August 1940 had been caused in this way. The Oil Board, before the war, had agreed that the best solution was to construct bund walls round every tank to confine the burning oil if the sides of the tank were breached. But the companies had been unwilling to do this; and, in any case, at many of the older installations this was impossible to do because the tanks were too close together. It was therefore decided to reduce the danger of fire spreading by emptying or 'sterilising' tanks next door to full ones. In August 1939 the Government had ordered the companies to put the plan into effect. At the outbreak of war 72,000 tons of tankage holding the more inflammable 'white oil' products (that is paraffin, motor and aviation spirit etc.) and 31,000 tons of tankage holding 'black' products (that is products heavier than paraffin) were sterilised. By August 1940 nearly a million tons of non-naval tankage had been emptied. The Admiralty adopted this policy on an even greater scale. The emptied tanks were filled with water, partly to increase their value as a fire break and partly for fire-fighting purposes.

It was possible to sterilise tankage on a large scale in the eastern half of the country only because the main load of oil stocks was carried in the west. When the west coast installations became equally vulnerable to air attack they had no spare tankage to sterilise. Individual 'bundings' was also out of the question in the older installations. In September 1940 the authorities hit on another solution; to construct internal partition bunds isolating clusters of tanks. This would at least keep the spread of fire within limits. The Oil Control Board approved this suggestion on 6th November; three weeks later a programme was launched for the construction of twenty-four miles of earth and concrete partition bunds. The Government, following its usual practice, agreed to shoulder half the cost; the rest was passed on to the consumer.

(iv)

### Diversion and Congestion

It has been stated that in the summer of 1940, for the first and last time in the war against Germany, tankers were in plentiful supply. Even so the British oil authorities, in the midst of their precautions against invasion and air attack, found themselves faced with an import crisis.

The trouble at this time was congestion at the ports. Although, contrary to expectation, the oil ports in the eastern half of Britain survived the German air onslaught virtually intact, they were used less and less after the fall of France because of the Admiralty's reluctance to risk ships in these more dangerous sea approaches and coastal waters. Restrictions on the use of ports in the more exposed parts of the country began in June 1940 when the Channel was closed to deep-sea shipping. This meant that Fawley and Hamble on Southampton Water, which normally handled about 10 per cent. of Britain's oil imports, could no longer be used. Oil traffic along the east coast was also affected. With the Channel closed tankers bound for east coast ports now had to sail round the north coast of Scotland. In the middle of July the Admiralty limited the kinds of ships allowed to sail to ports south of the Firth of Forth. Fast diesel-engined ships and vessels of over 7,000 tons were banned: the motor ships were particularly liable to detonate acoustic mines, and the danger from magnetic mines increased sharply as the beam of a ship exceeded sixty feet.

If this ban to ports south of the Firth of Forth had been strictly applied, the implications for oil traffic would have been serious, since more than half the Allied tankers were ships of the forbidden types. The oil authorities protested however, and it was subsequently agreed that decisions should be settled with the naval authorities in the light of individual circumstances. In September, however, when heavy air raids began on Thameside, the restrictions on tanker movements became very severe. From 10th September 1940 only vessels of 6,500 gross tons or under were allowed to proceed as far as the Humber, and no ship larger than a coaster could continue further south.<sup>1</sup> From then until the last week of October, when this general ban was relaxed again, only three tankers, carrying cargoes of paraffin urgently needed in the London area, were allowed, by special dispensation, to discharge in the Thames Estuary.

<sup>1</sup> C. B. A. Behrens, *Merchant Shipping and the Demands of War* (H.M.S.O. 1955), Ch. VI.

The effect of these restrictions was to lay a much heavier burden on west coast ports. Following the September ban, the proportion of British oil imports received along the west coast rose to 83 per cent. This was a bigger percentage of the total than the west and south-west ports combined had been expected to receive when the plans for a full-scale shipping diversion had been drawn up before the war. But it reflected a much smaller traffic load. The following table shows the actual quantities of oil imported by Shell-Mex House through west, east and south coast ports during the first half of 1940, and during the months when the supply of tankers had improved.

TABLE 6

*Weekly Average Oil Imports\* into the United Kingdom by Groups of Ports†*

	Total	West Coast†	Thames	Rest of East Coast	South Coast
1938	213·4	81·5	69·9	35·6	26·4
January-June 1940	208·4	112·5	58·6	7·1	30·2
July	152·5	102·0	27·9	13·8	8·8
August	174·5	116·4	40·7	17·4	nil
September‡	114·4	95·4	6·0	8·7	4·3
October	105·5	87·3	7·7	5·8	4·7

\* Excluding Admiralty oil fuel.

† Excluding Northern Ireland.

‡ Average of five weeks.

The table shows that instead of rising, as might have been expected when traffic through other ports fell away, the amount of oil received through the west coast ports of Britain actually began to fall as the load upon them increased. In October, when they were handling the biggest proportion of total oil imports, these ports were receiving a mere 87,000 tons a week—less than at any time since the previous February. Yet in February 1940 their low imports had reflected the small number of tankers reaching this country; in October 1940 vessels were queueing off the west coast ports for as long as ten days waiting to unload.

This failure of the west coast oil ports to meet the increased calls made upon them took the authorities by surprise. It had been reckoned before the war that west coast ports could, if necessary,

(and assuming they remained relatively undamaged) handle all the country's war-time oil import requirements.<sup>1</sup> In October 1940 these ports were handling only half of what they would have had to cope with on the basis of pre-war plans. Where had the forecasts gone wrong?

It has been explained that port capacity depends basically on two factors: the ability of the port to receive and handle ships, or, in other words its berthing and unloading capacity; and the ability of the transport system behind it to move the unloaded goods away from the port area. It had been inland transport capacity which had worried the Petroleum Department most before the war; and it might well have been expected that transport shortcomings would have been the main cause of the fall in oil imports along the west coast in the autumn of 1940. There is ample evidence that transport was indeed the principal obstacle to the importation of other kinds of goods at that time.<sup>2</sup> The railways, the backbone of the transport system, were strained by having to move goods into the eastern half of the country from the west; and their burden was aggravated by the air raids and the precautions—such as slow running and movement in daylight only—which trains were compelled to adopt in the more vulnerable part of the country.

Unfortunately there are no records relating to oil movements within the country, so that it is impossible to determine exactly how the domestic transport system as a whole coped with oil traffic after the diversion of imports. It seems certain that coastal shipping was able to play a far smaller part than had been hoped in moving oil away from the ports. Before the war the oil companies had planned to move 1½ million tons of oil a year by coaster in the event of shipping diversion, making use of their combined fleet of twenty-nine coastal tankers. But Service demands had reduced this fleet by August 1940 to only nineteen vessels capable of moving not more than 850,000 tons of oil a year; in the months which followed, coaster carrying capacity declined still further. During the calendar year 1941, the only period for which figures are available, coastal tankers distributed only 540,000 tons of oil from ocean installations to coastwise depots.<sup>3</sup>

River and road transport took up part of the extra burden. Oil traffic up the Severn increased enormously after mid-1940, with the aid of tank barges brought round from the Humber where they could no longer be used. The requirements of the industrial Midlands seem to have been met entirely in this way.<sup>4</sup> Road tankers, which were normally used simply for local distribution to consumers

<sup>1</sup> See p. 65. Also p. 145 below.

<sup>2</sup> C. B. A. Behrens, *op. cit.*, Ch. VI.

<sup>3</sup> In August 1940 the Shell-Mex House coastal fleet contained nineteen tankers with a total cargo capacity of 12,000 tons; in February 1941 it contained nineteen of 10,400 tons capacity; in July 1941, nineteen of 11,600 tons capacity.

<sup>4</sup> Liquid cargoes included tar and ammoniacal liquor, but were mainly petroleum.

or retailers, also took on long-distance haulage. A vast new scheme to supply oil by road from the Mersey to the West Riding was introduced to replace waterborne movements inland from Hull. Depots normally fed from Southampton Water were fed from the mouth of the Severn by road. (The area around Southampton Water itself was supplied from the Bristol Channel by a ferry service maintained by small tankers specially brought from the West and East Indies in the summer of 1940.) The range of road deliveries out of the main west coast installations direct to consumers was extended from forty to sixty miles. This extra contribution from the road tanker fleet was made possible by the war-time practice of working the lorries on double shifts. Throughout the period of intense enemy bombing, Shell-Mex House was able to keep a pool of tank lorries in reserve to meet emergencies in bombed areas.

But, despite the efforts of the road tankers and the tank barges, there can be no doubt that the main weight of moving the extra oil in from the west coast after the middle of 1940 fell on the railways. Apart from the Leeds area the whole of the industrial North-East had to be supplied with white oils by rail from the Mersey. London was also supplied by rail. Here a special problem arose from the fact that many of the oil distribution depots were sited along the river and inaccessible to railborne supplies. To deal with this problem the authorities, before the war, had set aside a number of sidings on the main railway routes to London to be used specifically for unloading oil trains. From these sidings the oil was to be transferred to road tankers for distribution in the usual manner. This plan was put into effect as far as possible, in 1940, with trains from Avonmouth unloading at Brentford and Kew, and trains from Stanlow unloading at Chalfont. Fortunately, oil seems to have moved more smoothly on the railways during the critical months than most other goods. This was a reward for careful preparation. The despatch of tank cars in special oil trains made possible by pooling had begun in the early months. As a result the oil trade was spared the shortage of rolling stock which hampered movement of other goods. Routes which avoided the main marshalling yards and junctions had been agreed between the oil and railway companies before the war, and the pattern of oil distribution was planned to fit in with regular railway operations as far as possible. Each main oil installation had a railway movement officer. Possibly the fact that sea shipment and inland distribution were both handled in this case by one authority, Shell-Mex House, made it easier to adjust cargo arrivals to the exigencies of a domestic transport system in which railways and road vehicles, coasters and barges, worked in a smooth co-ordination that contrasted with the administrative confusion then apparent at the dry-cargo ports.

Of course oil movements could not escape entirely from the effects of general railway congestion. For example, in the months after the fall of France, the railway lines out of South Wales were blocked by trucks loaded with the coal that could no longer be exported to the Continent. Consequently the oil port of Swansea with its five ocean tanker berths, which had received 46,000 tons of oil a week during June when its storage had been nearly empty, could handle little more than 2,000 tons a week between July and September. But even if there had been no blockage, the rail system was not big enough to enable both Swansea and Avonmouth to be worked simultaneously at full capacity—as the pre-war plans, it will be recalled, had so readily assumed could be done.

It is impossible to say for certain whether or not Britain's oil transport facilities were working at full stretch in the summer and autumn of 1940. There is no evidence whatever to suggest that, Swansea apart, the working of any of the main western oil ports was affected by shortage of transport to clear them. The fact that, after allowing for working 'ullage',<sup>1</sup> over 10 per cent. of the storage space available for refined products at west coast installations was vacant<sup>2</sup> while imports were approaching their lowest, is an indication that the trouble lay elsewhere. In fact, as soon emerged, it was not the capacity of these ports to take in cargoes but the rate at which incoming tankers could discharge them which was the limiting factor on west coast oil imports in the late summer and autumn of 1940.

Yet it had been this point of tanker handling that had roused the fewest qualms before the war. The pre-war examination of this question by the Petroleum Department had been far too superficial. From the exhaustive survey of United Kingdom ports made by the Headlam Committee,<sup>3</sup> the Petroleum Department had picked out twenty-three ocean tanker berths (excluding berths at naval bases) as available on the safer side of the country. It was assumed that each berth could handle an average of two tankers, each of 9,000 tons capacity, a week. On this assumption it seemed to follow that about 400,000 tons of oil a week could be discharged along the west coast. This was three times as much as they would need to receive under diversion conditions in war-time. Perhaps because the surplus of capacity appeared so large, no notice was taken of the fact that twelve of these tanker berths could not handle ocean tankers at anything like this rate. Either they were not long enough or their

<sup>1</sup> The unoccupied space which has to be preserved in oil storage to provide for differences in the rates of offtake and supply.

<sup>2</sup> On 22nd August, refined stocks at west coast storage amounted to 1.4 million tons against a net available tankage capacity of 1.6 million tons. By 26th September, the gap of 200,000 tons had widened to 350,000 tons.

<sup>3</sup> See p. 65.

water was not deep enough to take fully-laden vessels of average size; or storage capacity behind the berths was insufficient, or specialised to receive only certain products such as lubricating oil or aviation spirit. Leaving Swansea out of account as well because of the inadequate rail capacity behind it (which the Department ought to have, but did not in fact, take notice of), this meant that the whole burden of the traffic fell on the Clyde, the Mersey and Avonmouth. At the outbreak of war these had eight berths between them, but two more had been made available for black oil cargoes by the summer of 1940.<sup>1</sup> On the pre-war assumptions these ten berths, with some assistance from the rest, might just about have been able to cope with about 200,000 tons of oil a week. This was equal to the total oil import programme (excluding Admiralty oil fuel) in the second half of 1940.

But it had always been optimistic to assume that each tanker berth could handle two tankers a week in war conditions, and in the autumn of 1940 this was far beyond the bounds of possibility. Tankers took longer than expected both in moving up to the west coast berths and in getting away from them again after discharging. This was partly due to a shortage of tugs which affected all traffic. But it was also due in large measure to the geographical characteristics of the west coast oil ports. For one thing none of them could be entered except at, or near, high water; and at some ports the incoming tankers had to approach the berths through narrow and congested reaches. To get to the berths on the Clyde, for instance, vessels had to pass through a narrow twisting channel which was awkward to navigate and was frequently mined. Tankers bound for Stanlow, then the most important of the west coast oil ports, had to make a seven-mile journey up the Manchester Ship Canal, taking their turn with dry-cargo traffic. At Avonmouth too, there was often delay, for the oil berths had to be approached through the tidal lock entrance.

The difficult approaches to all the west coast ports also meant that the movement of tankers to and from the berths was hedged around with local safety regulations, most of which made for delay. For example, tankers were rarely allowed to berth after sunset. This meant that, if high tide occurred during the hours of darkness, a great deal of time was lost. It was calculated that at Stanlow during October tankers spent more than half their time in port moving towards and away from the berth. These factors made the west coast berths more difficult to work than those in other parts of Britain and had a cumulative delaying effect when traffic was heavy. The

<sup>1</sup> Three at Stanlow, three at Avonmouth, one at Dingle Bank (Liverpool), one at Bowling on the Clyde. In addition the Admiralty made their berth at Old Kilpatrick on the Clyde available to civil traffic, and a layby on the Manchester Ship Canal outside Stanlow docks was opened for tankers carrying the heavier, less volatile, oil products.

pre-war estimates of tanker performance in United Kingdom ports, being based on an average taken for the country as a whole, had failed to take such particular port problems into account.

Tankers were not only slower than expected in moving to and from their berths: they were also slower in discharging when alongside. This again was largely due to safety regulations which the oil companies thought generally excessive, and which proved specially irksome in war conditions. During the discharge of so-called 'low-flash point' oil products such as petrol and paraffin a highly inflammable vapour is present which has to be guarded from contact with a naked flame. Because of this danger the discharge of such cargoes was stopped during air raid alerts. At some ports it was stopped even every time another vessel with steam up passed close to the unloading tanker. As an additional precaution at Avonmouth and Stanlow, port authorities refused to allow tankers unloading low-flash point oil to work their pumps by their own steam power. They had to rely, instead, on steam from the shore which often had less pressure because of the distance it had to travel (and the less pressure the slower the discharge).

Finally, even after oil tankers had finished discharging, they might still be delayed in berth to carry out minor repairs. Such delays were increasingly frequent during the second half of 1940. Sometimes, where a tanker that had carried petrol or paraffin was concerned, these repairs could not begin until the vessel had first been 'gas freed'—that is, cleared of inflammable vapour, a process which might take more than forty-eight hours. Admiralty instructions issued early in the war insisted that gas freeing should be carried out before any vessel that had carried these so-called 'white products' was allowed to leave port. In the autumn of 1940 this was sometimes carried out at the berth even when no repairs were required.

Port congestion was a problem which Britain had the power to solve herself. The steps she took to do so will be described in the chapter to follow. Another problem, which the British found it harder to cope with unaided, meanwhile demanded attention. This was the problem of foreign exchange.

(v)

## Dollars and Guilders

By the middle of 1940 Britain's reserves of gold and foreign currency had begun to dwindle at an alarming rate. It looked as if the flow of many vital supplies, including oil products, would be stemmed no

less effectively by lack of means to pay for them as by inability to ship, or unload them.

As we saw, financial constraints on purchasing had not loomed large in pre-war thinking about oil supply. Not until the spring of 1939 had the foreign currency aspect of supply come even briefly to the attention of the Oil Board. But from the moment war broke out the Treasury began to impress on all importing Departments the necessity of going carefully in purchases abroad. A number of foreign currencies were designated as expected to be in short supply and the Treasury set up an inter-departmental committee, the Exchange Requirements Committee, to supervise and review all proposals and plans for governmental spending in these 'hard' currencies. Petroleum purchases were considered with the rest. In October 1939 the Service departments and the Petroleum Department (which was responsible for the oil companies currency expenditure) were asked by this committee to make an estimate of the scarce or 'hard' currency needed for oil supply over the first twelve months of war. In November the Exchange Requirements Committee considered their replies and suggested various economies.

No serious attempt was made to cut down hard currency expenditure on oil, however, during the first nine months of the war. The obvious policy—greater drawings from sterling sources in place of western hemisphere dollar suppliers—would have involved the use of more tanker tonnage; and, despite Treasury efforts to get the two problems treated on an equal footing, tanker shortage was treated as the major problem in the winter of 1939–40. Discrimination against dollar suppliers could also conflict with market agreements of the oil companies, and the Government was disposed to tread warily in its approach to this thorny question. As a memorandum from the Bank of England remarked in November 1939, the companies would not co-operate willingly in any scheme which completely disregarded their rather hard-won agreements and in view of their complex and widespread arrangements, would probably have 'little difficulty in beating any external control at their own game'. One measure which did commend itself was to increase oil imports from Roumania, a country where all the major suppliers to the United Kingdom could draw on resources of their own. Not only would this help to divert oil from the Germans but from the point of view of the exchange control, Roumania was as good a source of supply as could be found, since she was a debtor to Britain on long-term loans; there was also an Anglo-Roumanian Clearing Agreement.

By the summer of 1940 however it had become clear that the scope of the British war effort would be drastically curtailed unless Britain could obtain American supplies without payment. The British hoped that the American Administration would make this possible, and

made no attempt to make cuts in purchases which might spell defeat. On the contrary, they placed big new orders for war materials. However they knew that nothing could be expected until the Presidential elections were over in November; by then, the Chancellor of the Exchequer warned the War Cabinet, the gold reserve would be almost exhausted unless the rate of hard currency spending were cut down. On 22nd August the War Cabinet asked all importing Departments to do what they could to economise.

In answer to this appeal the oil authorities made their first serious examination of the possibilities for saving foreign exchange. To appreciate what these possibilities were it will be useful to have some idea of what the programme of expenditure was and how it was constructed.

In estimating their hard currency requirements, the oil authorities had to consider, not only the oil needs of the United Kingdom,<sup>1</sup> but also those of the whole sterling area. The members of the sterling area imported oil from many different sources; but there were, from the foreign exchange point of view, only two broad categories of supplies in the middle of 1940. About 60 per cent. of requirements were bought for sterling from oil companies financially centred in London. The rest were met by American oil companies drawing supplies not only from the United States, but also from producing fields and refineries in the Caribbean area and the East Indies. The sums paid for these supplies, after deducting local distribution costs, had to be remitted by the marketing companies to their principals in United States dollars. In the twelve months from September 1940 oil purchases from American companies were expected to cost \$124.5 million.

The supply of sterling oil also indirectly made calls on Britain's supplies of hard currency. The sterling supplying companies had to spend foreign currency on producing it, and such amounts as they could not earn by selling their products in appropriate markets, had to be provided by Britain. Among the currencies required by the sterling companies was Dutch guilders to pay for oil produced, largely in Dutch territory, by the Dutch companies of the Royal Dutch/Shell Group.<sup>2</sup> In the early months of the war guilders were listed as hard currency and the first estimates drawn up by the Petroleum Department treated them as equivalent to United States

<sup>1</sup> The total value of crude and refined oil imported into the United Kingdom in 1938 was just over £46 million. Of this £10.5 million came from the United States.

<sup>2</sup> The costs of refining on Curaçao and at the Shell refinery on Aruba, which between them processed nearly all the Shell oil exported from the South American mainland, were also guilder costs. Guilders also had to be remitted to cover the Royal Dutch share of the dividends on the profits of the Group's operations as a whole. On the eve of the war dividend payments to the Royal Dutch Petroleum Company amounted to about £9 million worth of guilders.

dollars. But after the Netherlands had become an Allied country, a Payments Agreement was signed which made Dutch Empire guilders freely available for exchange against sterling.

However, in addition to the guilders needed by the Shell Group, all the sterling companies needed United States dollars, partly to pay for such small items as royalties on American patents and the wages of American technicians, but chiefly to pay for materials and specialised equipment. On the eve of the Second World War the sterling companies were purchasing about 60 per cent. of such equipment and materials from the United States. Finally, to operate in the oil producing countries the sterling companies needed local currency to pay for labour and stores and to meet royalty and taxation charges imposed by the host governments. In the Middle East this presented no problem, for producing countries there were either in the sterling area themselves, or were willing to accept payment in sterling. But in Venezuela and the other main producing countries in the western hemisphere, local currency could be bought only with United States dollars. All these expenditures amounted to a considerable sum: in the twelve months from June 1940 the sterling companies expected to spend \$58 million.<sup>1</sup> This was nearly half the anticipated dollar expenditure by the sterling area on purchases from American companies. Against this expenditure, however, had to be set \$53 million which the sterling companies, and chiefly Shell, expected to gain from sales in South American and Far Eastern markets. Hence the true dollar component of these 'sterling' supplies was actually about 9 per cent.

What was the net hard currency cost of oil supply to the sterling area? In April 1940 the Petroleum Department had calculated that dollars and guilders had been spent at a rate of nearly \$200 million a year during the first six months of war; and this calculation took no account of shipping costs. For the twelve months from September 1940, when guilders were left out of the reckoning, prospective net expenditure was estimated at \$153.5 million. Another \$17 million was to be spent on buying aviation spirit from the United States under contracts which had been taken over from the French.

This analysis makes it clear why the authorities did not think it practicable to try to save dollars by reducing civilian consumption in Britain. Big scale cuts would have been needed to make any saving that was worth while; and more than half of any savings achieved would have been at the expense of sterling suppliers. A more practical approach was to see what could be done to reduce the dollar component of the cost of sterling oil, and specifically the \$32 million due to be spent by the sterling companies on buying

materials and equipment from the United States. This proved to be a blind alley however. The companies said that economy was impossible without harming the efficiency of their operations. They had, the companies explained, already abandoned their normal development programmes and were confining themselves to schemes considered vital to the war effort. Nor was it possible for them to switch some of their purchases to this country. The trend was all the other way. The share which Britain's hard-pressed industry could contribute to meeting oil company requirements for materials and equipment had fallen from a pre-war 40 per cent. to only 10 per cent. Indeed the outbreak of war in the Middle East brought up the prospect of spending even more dollars on materials—in this case the tin-plate and steel drumsheets needed to manufacture containers for the distribution of oil supplies to the military in an area where facilities for bulk transport were small or non-existent.

There was equally little chance of reducing the dollar expenditure of the sterling companies in their overseas operations; this expenditure was estimated at \$22 million for Shell and \$4 million for the other companies. Here also the trend was the other way. Currencies hitherto 'soft' were showing signs of 'hardening' as countries hitherto willing to accept sterling grew restless when they found it impossible to convert this money into the goods they required. At the beginning of June 1940 a financial agreement with Roumania provided that 20 per cent. of the sterling accruing from the sterling companies' operations in that country should be convertible into gold; and that another 30 per cent. should be at the free disposal of the Roumanian government after certain fixed debts had been met. This Agreement never came into force since in July 1940 Roumania fell under Axis control. But a similar concession soon had to be granted the Iranians. The British government, in a relatively weak bargaining position on the morrow of the German victories, thought it prudent to make this concession: it was agreed that, from June 1940, Iran should be allowed to convert up to £3 million sterling a year into gold. Such transfers were not included in the oil companies 'hard currency balance' since the British were able to insist that the Agreement should cover all the sterling assets of the Iranians and not merely the funds accruing from operations of the Anglo-Iranian Oil Company. But these last-mentioned funds were in fact Iran's chief source of sterling income. Therefore the Agreement meant, in effect, that even Iranian oil now had a hard currency component additional to the company's dollar expenditure on American equipment and materials.

Failing dollar savings by sterling oil companies, the Government took another hard look at the costs of buying oil from the American companies. Forty-nine per cent. of the oil supplied by these

<sup>1</sup> Shell would be responsible for about 85 per cent. of this.

companies to the sterling area countries came from Dutch colonial territory. Could not these companies accept payment in guilders—now a soft currency? This would bring oil into line with other commodities which, according to a Treasury rule, should be paid for in the currency of their country of origin. The American oil companies resisted this idea. As a minimum they insisted on being reimbursed for the dollar costs incurred in producing these supplies in Dutch territory. Their stipulation meant that in practice there would be little dollar saving to be made on supplies provided from American-owned refineries in the Dutch West Indies. The American companies reckoned that most of their costs of production were incurred in Venezuela or Colombia, both of which were 'dollar area' countries. There were better prospects for dollar savings on supplies from the East Indies. There, the dollar content of production costs was smaller, and producing companies in the East Indies sold much of their output for dollars in eastern markets. In March 1941 the American Standard-Vacuum Oil Company, operating in the East Indies, agreed to accept only 15 per cent. payment in dollars.<sup>1</sup> But this was a relatively minor economy. The saving it would produce was not expected to exceed \$12 million in the course of 1941.

To make savings that would really make a difference to the British balance of payments situation, there remained only the possibility of import discrimination against the American oil companies—the nettle that the British authorities had shied away from nine months earlier. By drawing up to the hilt from sterling sources it was estimated that \$50 million a year could be saved. A relevant consideration was that, for the first time in the war, it would now be physically possible to avoid drawing on dollar suppliers. The sterling companies were producing at well below their capacity—as, indeed, were all the oil companies which had lost markets in continental Europe; and the tanker situation no longer made it necessary to draw from the western hemisphere instead of from Iran.

This last possibility for dollar savings could not be left unexplored. In September 1940 Sir Andrew Agnew, then visiting the United States, was asked to sound out the American oil companies. He found them generally sympathetic, but resolutely opposed to the idea of discrimination. Smarting from the loss of their markets on the European continent they feared that any trade they allowed to be diverted to their sterling competitors would never be recovered. The most they were prepared to agree to was payment in 'blocked' sterling. The two American companies which would have been

<sup>1</sup> But a special arrangement was made in regard to 100-octane aviation spirit which the company was manufacturing under long-term contract for the Air Ministry. For this 50 per cent. dollar payment was allowed to cover production expenses and *profits*, since the manufacture was entirely for the benefit of the British government.

chiefly affected by a discrimination policy also agreed, by the end of the year, to cancel orders, for the most part without payment, worth \$10 million: these orders (for aviation spirit) the British had earlier taken over unwillingly from the French<sup>1</sup>—unwillingly since the particular product ordered by the French would not have met British requirements as to quality. Cancellation of these contracts was a benevolent gesture, although it would be naive to overlook the growing requirements of the American government at that time for aviation spirit.

Sir Andrew Agnew's informal negotiations were not pushed any further. To antagonize the American oil companies was unthinkable, and more than company goodwill was involved. Late in September, a few days after Sir Andrew Agnew's talks, the British received a specific warning from the United States Secretary of the Treasury, Mr. Henry Morgenthau, that 'handling of oil exchange as a separate issue or the diversion of oil companies' supplies on exchange grounds before giving consideration to the exchange question as a whole would cast doubt on the United Kingdom's ability to finance other purchases'.

Thus ended the efforts of the British to achieve cuts in dollar expenditure on oil. During the autumn and winter of 1940–41 the British oil authorities could only wait for whatever solution to 'the exchange question as a whole' the United States government might have in mind.

<sup>1</sup> Another \$7 million worth of French contracts placed with smaller United States companies were cancelled during 1941 on the payment of out-of-pocket expenses.

## CHAPTER VI

### INTO THE SECOND WINTER

(i)

#### The West Coast

**I**N the late summer and autumn of 1940 the oil authorities had enough to think about in coping with the physical aspects of supply. Despite the surplus of tankers, oil stocks were beginning to fall. At the end of August stocks of all products, except naval oil fuel, had been above or not far below target level. By the end of October, however, oil stocks as a whole were lower than at any time since the outbreak of war. The cause for declining stocks was explained in the last chapter: congestion of traffic through west coast oil ports resulting from diversion of imports.

Confronted with this congestion there was no alternative but to relax the diversion policy. In fact it had never been maintained *in toto*: since August occasional tankers had been going to the south coast by special arrangement. In the middle of October the Executive Committee of the Oil Control Board decided that the ban on east coast shipments would have to end. The naval authorities resisted for a time, but by the end of November they had been brought to agree that up to forty tankers a month should be allowed to discharge in the Thames Estuary and other east coast ports. At first the Navy still insisted that these tankers should not exceed 7,500 gross tons. But in January 1941 they agreed to raise the upper limit to 8,500 gross tons. This meant that the great majority of ocean-going tankers could now sail to the Thames.

These decisions were taken under the stress of emergency to stop a slide in stocks which was beginning to look catastrophic. They were highly undesirable decisions from the shipping point of view, since valuable and vulnerable ships were now being exposed to extra danger. It was clearly vital to speed up movement through the west coast ports without delay. Towards the end of 1940, the Chairman of the Oil Control Board's Executive Committee went on a tour of these ports to see things for himself. His tour was followed by a determined drive to reduce the delays to tankers by improving their organisation and procedures.



Among the chief obstacles to speedy tanker handling were the safety regulations enforced at the various ports. The significance of these had not escaped official notice before the war. In particular it had been foreseen that the prohibition in force at some ports on the movement and discharge of tankers after dark, would have to be relaxed. A set of less restrictive conditions governing the discharge of petroleum in ports had been drafted by the Ministry of Transport and was promulgated in a Statutory Order the day after war broke out.<sup>1</sup>

But the publication of Government regulations did not prevent port authorities from maintaining their own restrictive bye-laws to meet their local circumstances. For instance, whereas the use of ship's steam for discharging was not forbidden in the Ministry's draft regulations, it was prohibited at both Avonmouth and Stanlow under two subsidiary Orders, issued early in the war, which laid down special conditions for these two ports.<sup>2</sup> Accordingly in November 1940 the Government began to approach each of the port authorities in turn in an endeavour to persuade them to reconsider some of the local restrictions. The port authorities were not always easy to persuade, for they were acutely conscious of their responsibility for the safety of the ports under their care. Important modifications were secured, but sometimes it was the Ministry which had to give way. Thus, the Port of Bristol Authority was persuaded that its ban on using ship's steam was having a serious effect on the rate of discharge at Avonmouth, and therefore relaxed its prohibition. But the Manchester Ship Canal Company, fearful of the effects of an explosion which might block the Canal, adamantly refused to let tankers carrying spirit get up steam, either at Stanlow docks, or anywhere in the approaches to the port. On the other hand the Stanlow regulations did not forbid tankers to approach at night, though at Avonmouth docking at night was prohibited until the autumn of 1941. Perhaps the Government's chief success was to reduce delays caused by air raid precautions. After November 1940, discharge, which had hitherto been halted during alerts, was allowed to go on at all the ports until enemy aircraft were actually close at hand.

While the Ministry of Transport was taking action on the question of safety regulations, Shell-Mex House was doing its best to improve the actual handling of tankers in ports. Down to the end of 1940 there had been little supervision or control over this from the centre. The jurisdiction of the Port Petroleum Officers was limited to the

reception of the cargoes on shore and their onward despatch. They had neither the power, nor indeed the experience, to deal with the tankers. Therefore, at the end of 1940, Shell-Mex House set up a new branch to its tanker tonnage section to bring tanker handling in port under continuous scrutiny and analysis. This new branch received regular returns from each port on the performance of tankers and reports on all local problems and delays. Branch representatives at the various ports watched prompt discharge of vessels. In addition, men of equivalent standing to marine superintendent were appointed to look after tanker repairs.

The information provided by this new machinery enabled Shell-Mex House to launch a drive to improve port facilities and procedures. Extra pipelines were laid from ship to shore and high pressure discharge hoses installed. Booster pumps were provided and supplies of shore steam increased where this was an advantage. Nor were the ships themselves forgotten. Pumping equipment on the older tankers was often inadequate and in any case, ships pumps tended to deteriorate, for it was difficult to carry out proper maintenance work amid the hazards of a war-time voyage. Now it was arranged that oil tankers should be regularly inspected in port and defective equipment renewed.

Procedures for tanker handling were also improved. When tankers carried more than one oil product, both cargoes were discharged simultaneously whenever possible, and steam power from shore was used in conjunction with the ship's boilers so as to work all the pumps at maximum pressure. Masters of tankers carrying fuel or diesel oils were instructed to warm up their cargoes before entering port, so as to make them easier to discharge. Tanks chosen to receive incoming cargoes were selected with an eye to their proximity to the berth that would be used.

There were also improvements in organisation. For example it became the custom to take on stores and bunkers while discharge was going on. The mains water supply on shore was used to assist the vessel to take on water ballast. Tankers were allowed to leave the berth before 'gas-freeing' and, where possible, repairs were carried out away from berth.

The results of these improvements can be best shown in tanker figures. In March 1941 tankers were taking on average eight days less to turn round in United Kingdom ports than they had taken the previous autumn. By the summer of 1941 the average rate of tanker discharge along the west coast of Britain had risen to over 200 tons an hour, compared with only some 90 tons in the autumn of 1940. The average weekly intake of oil at the west coast ports was nearly double that of October 1940.

<sup>1</sup> Petroleum Spirit in Harbours Order, 1939 (S.R. & O. 1939 No. 1180).

<sup>2</sup> Petroleum Spirit in Harbours (Manchester Ship Canal) Order, 1939 (S.R. & O. 1939 No. 1539) and Petroleum Spirit in Harbours (Port of Bristol) Order, 1939 (S.R. & O. 1939 No. 1910).

(ii)

### Problems of Tanker Management

The successful attack on port congestion removed one factor limiting United Kingdom oil imports; and immediately uncovered another. Imports failed to build up as tanker handling improved because not enough tankers arrived at British ports during the winter of 1940-41. On the face of it this seems surprising. After all, there had been a surplus of tankers throughout the summer of 1940, and Allied and other vessels had been steadily brought under control of the Ministry of Shipping ever since. Between September 1940 and February 1941 71,000 deadweight tons of Danish, French and Roumanian tonnage was requisitioned, and a further 126,000 deadweight tons of Norwegians were taken on time-charter. Two of the Belgian tankers were also chartered by the Ministry. During this period tanker construction in Britain also picked up to some extent: output could not reach the pre-war expectation of four tankers a month because of the resources that had to be devoted to building dry-cargo vessels, which accounted for over 87 per cent. of the tonnage launched in 1940. However seven new tankers of 80,000 deadweight tons were launched between September and February, and output eventually rose to an average of two to three tankers a month. To set against these acquisitions, losses from sinking rose considerably once the Germans had firmly established themselves along the west coast of Europe. By the end of 1940 nearly one in ten of the tankers under British control in July had been sunk:<sup>1</sup> both absolutely and proportionately this far exceeded the rate of loss sustained in the early months of the war. Even so the size of the 'controlled' tanker fleet remained in the region of 6.9 million deadweight tons throughout the winter.

Thus it was not because of losses of tankers that oil shipments to Britain remained low during the winter of 1940-41: it was because the vessels were working less efficiently. The German occupation of western Europe had brought about a further decline in the carrying capacity of Allied tankers and one which was even more marked than that which had followed the outbreak of war. The causes were the same, the shortening of the tanker working year as tankers spent longer waiting to repair and refit; and the lengthening of their round-voyage times. The longer repair times were due to a greatly increased pressure on repair facilities. As 1940 wore on more and more tankers were damaged as well as sunk by enemy action. Yet

<sup>1</sup> In addition a substantial amount of 'non-controlled' tanker tonnage working in Allied trades were sunk. See Table 16, p. 244.

even when casualties had been lower Britain's ship repair yards had found it difficult to cope with the flood of work which war had thrust upon them—including not only repairs to war damage but also the fitting of defensive equipment such as guns and degaussing coils. Ships had to be sent to Continental repair yards and routine overhauls postponed. After the middle of 1940 these dry-docks at Continental ports were no longer available. At the same time the risk of air attack prevented full use being made of the repair yards along the south and south-east coasts of Britain.<sup>1</sup>

The Ministry of Shipping met the situation by encouraging owners to have their vessels repaired abroad, offering itself to meet additional costs. From the autumn of 1940 more and more of the major tanker repairs were carried out in Canada. But the queue of vessels waiting to enter dry-dock went on lengthening. Apart from war casualties, damage from normal marine causes was heavy during the rough Atlantic winter of 1940-41. By then, moreover, the routine overhauls which had been postponed in the early war months could be postponed no longer. Nor did the demand for the fitting of defensive equipment slacken off. As British tankers were dealt with, newly-controlled foreign vessels took their place. To add to the load it became necessary, after the middle of 1940, to fit new and more elaborate 'degaussing' equipment which took longer to install.

There is no means of knowing exactly how much lengthened repair times reduced the effective working strength of the tanker fleet in the autumn and winter of 1940-41. During the last three months of 1940 between seventy and eighty tankers were reported out of action in Britain waiting for equipment to be fitted or for repairs which would take more than seven days. In February 1941 a million deadweight tons of tanker tonnage was thus immobilised.

Tanker carrying capacity was also affected by a considerable increase in the average length of round-voyage times after mid-1940. This was mainly a result of re-routeing. Since May 1940, when Italian intervention began to seem imminent, all tankers sailing east of Suez had been sent round the Cape of Good Hope. Later, after France had fallen, they made their way southward by a long outward sweep into the Atlantic to avoid the dangerous proximity of a German-occupied Europe. These route changes increased the sailing distance between Britain and Abadan from roughly 6,600 miles to about 11,200 miles, and that between Britain and the East Indies

<sup>1</sup> An indication of the extent to which repair facilities on the east and south coasts were under-employed (in late 1940) is given by the figures of tonnage under repair shown below:

	000 gross tons		
	South Coast	London E. Anglia	N.W. England
Second half of May 1940 . . . . .	198	203	251
December 1940 . . . . .	76	45	445

from about 8,300 miles to about 11,600 miles.<sup>1</sup> Distances from western hemisphere loading ports were also lengthened, though less markedly. Incoming tankers now made a detour by way of the coast of Greenland and north of Iceland. On reaching Britain they sailed south to the Clyde through the Minches. Outward-bound ships sailed north of Ireland instead of south of it as formerly.

Another factor increasing round-voyage times was the increasing complexity and scope of convoy arrangements required to contend with the enemy's greater striking power. New 'slow' convoys of 7½ knots were introduced into the Atlantic in August 1940. Since escorts were in short supply this meant that convoy frequencies had to be reduced, with the result that tankers and other ships lost more time waiting at assembly points. These delays were particularly marked in British coastal waters. Tankers bound for London had to travel in one coastal convoy from the Clyde to the Forth; there, usually after extra degaussing, they joined another convoy which took them south. In the winter of 1940 these tankers were taking an average of twenty-four days to complete a round voyage between the Clyde and the Thames—roughly a third of the average round-voyage time between the Dutch West Indies and Britain's west coast. As for the more numerous tankers which discharged at west coast ports, these frequently had to wait while the port approaches were swept clear of mines, a hazard formerly encountered only in east coast waters.

TABLE 7  
*Tanker Round Voyages—Spring 1940 and Winter 1940-41*  
round trips a year

	East Indies to United Kingdom	Persian Gulf to United Kingdom	Caribbean to United Kingdom	United States Gulf ports to United Kingdom
Spring 1940	3.5	4.3	6.0	5.3
Winter 1940-41	2.25	2.5	4.5	4.5

Unfortunately no precise figures exist about tanker performance in this period of the war since regular statistics were not kept before the spring of 1941. Table 7 compares assumptions about tanker performance in the spring of 1940 and in the winter of 1940-41 which were made for programming purposes. Since these assumptions reflected actual experience, comparison between them gives some indication of the decline in tanker efficiency caused by the events of mid-1940, taking account of all factors, including lengthened repair times.

<sup>1</sup> The mileage calculation is based on a journey of 8,200 miles from United Kingdom west coast to South Africa instead of a normal 6,000 miles. A circular to shipowners, dated 1st September 1940 advised them to make this mileage allowance in calculating bunker needs.

The effects of this decline in tanker efficiency were masked from the British authorities until the late autumn of 1940 by the existence of port congestion. By the onset of winter, however, it had become clear that tankers were no longer arriving at British ports in sufficient number to meet programmed requirements. December 1940 and the early months of 1941 were dominated by efforts to increase tanker arrivals.

The first and obvious step was to get more tankers into United Kingdom trade. This was easy enough, because, during the tanker surplus of the summer, many British-controlled tankers had been diverted into cross-trades in order to build up oil stocks overseas—particularly stocks east of Suez. This process was now simply put in reverse. By the middle of December 1940 ten tankers had been withdrawn from Indian Ocean trades for service in the United Kingdom supply programme; by the spring of 1941 about forty had been re-allocated in this way. Tankers under British control were also pulled out of western hemisphere cross-trades, and steps were taken to bring Norwegian and other Allied-flag tankers working there under London's control. In November the Ministry of Shipping had reopened negotiations to get more Norwegian tankers on time-charter; and at the same time began to take up its option on the services of the 100,000 deadweight tons of Belgian tankers acquired under the Belgian Shipping Agreement of July 1940. The British also asked the Standard Oil Company (New Jersey)—which owned about two-thirds of the 800,000 deadweight tons of tanker tonnage sailing under Panamanian colours—to put more of these vessels into Empire cross-trades, thus releasing Allied vessels for the supply of this country.

Another step the authorities took was to re-arrange the pattern of Britain's supply in order to shorten tanker journeys to this country. While tankers had been in surplus it had been decided to use part of the spare capacity to draw a greater proportion of United Kingdom imports from Iran. This had the double advantage both of reducing dollar expenditure on oil (at a time when dollar saving was increasingly urgent) and of mollifying the Iranian government which was then protesting strongly at the low level of liftings from Abadan. In December 1940 the British began to put this policy in reverse. Despite the effect on dollar expenditure they stopped sending tankers round the Cape of Good Hope to fetch oil from eastern ports; by the end of the year thirty-six vessels arriving from the east had been or, were being, diverted to load their next cargo in the western hemisphere; by the end of February 1941, forty-eight tankers had been transferred from the Iranian run. The saving this made was calculated to be equivalent to adding twenty-one vessels to the fleet supplying Britain. The Iranians for their part seem to have accepted

the new policy without protest. Their sense of grievance had been allayed by the signature, in August 1940, of a new Agreement with the Anglo-Iranian Oil Company, which provided that the Iranian government's annual oil receipts from royalties and taxation combined should not fall below a minimum figure. If receipts did fail to reach that figure (which was higher than the receipts of any previous year) the company undertook to make the deficit good. The company also agreed to make back payments for the years 1939 and 1940, with the British government undertaking to bear half the costs.

A third important measure was devised to shorten the voyages of British-controlled tankers used to lift oil from the western hemisphere. American-flag and other tankers which could not, or would not, sail into the war zones were chartered to carry oil from the Caribbean and Gulf loading ports up to ports on the American north-eastern seaboard. From these ports the oil could be shipped on to Britain—through the war zones of the Atlantic—in British-controlled tonnage. It was reckoned that every 'controlled' tanker which lifted oil from New York or other north-eastern ports instead of from the Caribbean would save an average of ten days on its round-voyage time. The idea was put forward in December 1940 and quickly adopted. In January 1941 Shell-Mex House rented oil storage at New York and Baltimore; tankage was also set aside at Halifax, the nearest transatlantic port to Britain, and new tanks were installed there. The first 'non-controlled' tanker to sail on the Shuttle, as it was called, left Curaçao for North America on 25th January. By the middle of April 1941 some 220,000 deadweight tons of tankers were working in the Shuttle service to New York, Baltimore and Halifax. This was the second tanker-saving arrangement, it may be noted, that entailed costs in foreign currency; both the newly-chartered tankers and additional storage facilities on the north-east coast had to be paid for in dollars.

The withdrawal of vessels from the Iranian run and the institution of the Shuttle cut down the time that British-controlled tankers spent at sea. Still other measures reduced their time in port. Steps taken to improve turn-round time at ports in Britain<sup>1</sup> were extended to ports overseas. At the Government's suggestion Shell-Mex House appointed special marine superintendents to Curaçao, Trinidad, Halifax and Bermuda, as well as to Freetown<sup>2</sup> and ports in South Africa and India, to ensure that there were no avoidable delays on such matters as the provision of crews, water, or stores to tankers owned or managed by the big oil companies. These officers worked under the control of the new branch set up at Shell-Mex House to supervise turn-round at United Kingdom ports.

<sup>1</sup> See p. 157.

<sup>2</sup> Freetown, in the spring of 1941, was increasingly frequented by Allied shipping.

These efforts to speed up round voyages were supported by a drive to hasten tanker repairs. The newly appointed overseas representatives of Shell-Mex House were given responsibility for speeding up these repairs at their particular ports abroad. The Shell-Mex House men at United Kingdom ports also co-operated to hasten repair work. Increasing use began to be made of repair yards in the United States despite the cost in dollar currency. To get the best out of this dollar expenditure, Shell-Mex House in early 1941 enlisted the aid of Mr. B. B. Howard, of the Standard Oil Company (New Jersey), and Mr. Brewster Jennings, of the Socony-Vacuum Oil Company. Their role was to co-ordinate repair operations on tankers owned by the big oil companies. They also worked to speed up tanker turn-round in United States ports

(iii)

### Tightening Control

In the longer run these measures to make more effective use of 'controlled' tonnage and to speed up tanker handling transformed the supply situation. But the measures came late and took effect slowly. Tankers sent on the long voyage around the Cape of Good Hope to Iran could not be diverted at a moment's notice; once beyond the Cape they were committed to a round voyage which could take three months to complete. At the end of 1940 Britain entered the worst seasonal period for imports with her oil stocks lower than at any time during the war; and her stocks went on falling in the winter weeks which followed. This was a disappointing outcome of six month's stewardship by an oil and tanker control system which had been completely remodelled the previous spring.<sup>1</sup> Inevitably doubts were expressed about the effectiveness of the new administrative arrangement. The chief doubters were in the Ministry of Shipping where a growing concern with tankers had been reflected in an internal reorganisation in which the tanker section of the Sea Transport Department was expanded into a separate Tanker Division. The Ministry made no bones about its dislike of the way in which tankers had been handled in the summer of 1940. It would have liked to see the surplus vessels available at that time used to carry grain imports because it was short of vessels for this trade. Shell-Mex House opposed such transfers and only one or two newly-launched tankers were put to carrying grain. Those tankers which

<sup>1</sup> See p. 114 *et seq.*

could not be immediately used for oil supply had instead been held loaded at convoy assembly points on both sides of the Atlantic. This use involved high demurrage costs and was bad for the morale of the crews. But to the Oil Control Board the maintenance of stationary, loaded tankers seemed preferable to allowing these vessels to seek employment in neutral trades from which it might have been hard to promptly retrieve them; in any case there were political objections to allowing Britain's surplus vessels to work for that country most likely to seek their services—Japan. Finally the Board thought there was much to be said for keeping a potentially mobile oil reserve of this kind in readiness to replace the losses of stocks and storage anticipated once the German air onslaught against Britain began in earnest.

'Extravagantly wrong', was the comment of a senior Ministry of Shipping official on tanker policy in the summer of 1940. This official believed that too much control over tankers was held by Shell-Mex House. Even after the reshaping of oil controls in May 1940, the Government still exercised little more than a watching brief over the utilisation of all tankers not working for the Admiralty. Writing in August that year to the Chairman of the Oil Control Board's Executive Committee (who was, we note, the Government's principal 'watchdog') the head of the Ministry of Shipping's Tanker Division argued forcefully for stronger governmental control. He pointed out that in the choice of tankers for particular voyages questions could arise which Shell-Mex House was not qualified to consider. Such questions included whether the vessel could be used in dangerous waters without contravening one of the Shipping Agreements; or the extent to which British tankers could be used in safer trades without upsetting the other Allies; or again, whether a tanker allocated for one of the less important tasks in the oil trade might not be better employed, from a national point of view, carrying some other commodity. Questions of this kind could only be answered by the Government department responsible for procuring the services of foreign tankers and allocating tonnage between the various import programmes—in other words by the Ministry of Shipping itself.

As a step in the direction of control the Ministry proposed that the membership of the Tanker Licensing Committee, which carried out the day-to-day control of tanker movements, should be strengthened in order to make it competent to take such general issues of shipping policy into account. But this proposal was not accepted; instead, as a compromise, a Joint Consultative Committee was set up to ensure that they were not overlooked. This was a long way from satisfying the Ministry. What it really sought was the same degree of authority over tankers that it had possessed over dry-cargo ship-

ping since the previous spring when all dry-cargo vessels had been requisitioned; in other words not merely the negative power to prevent ships being used in particular ways, but the positive power to decide finally on the uses and trades to which tankers were put. The Ministry of Shipping secured the legal basis for such control at the end of 1940 when all British ocean-going tankers were at last brought under Government requisition.

The Ministry's next step was to create an instrument fit to use its new power. The old licensing system was now ended and, with it, the Tanker Licensing Committee as well as the new Joint Consultative Committee. These bodies were replaced by a Tanker Advisory Committee set up on 22nd January 1941 by the Minister of Shipping to advise him on the movements of tankers. The Tanker Advisory Committee, which held its first meeting on 7th February, was presided over by the head of the Ministry's Tanker Division and included a senior representative of the Petroleum Department (who was, until mid-1942, the chairman of the Oil Control Board's Executive Committee), and the chairmen of the Overseas Supply and Tanker Tonnage Committees of Shell-Mex House.

The Tanker Advisory Committee authorised tanker voyages as a direct agent of the Minister of Shipping; the committee also acted as a licensing authority for tankers which it had not been thought necessary to requisition, such as those engaged in local trades in various parts of the world. The new committee met once a week—at first, for convenience, at Shell-Mex House—but later, to emphasize its governmental character, at the Ministry of War Transport.<sup>1</sup> In practise the Tanker Advisory Committee acted as an independent executive, using the authority invested in the Minister to allow, or disallow, the suggestions of the trade. But since its status was only advisory, ultimate responsibility remained with the Minister of Shipping, and the wishes of the Ministry representatives could carry the day even against majority opinion in the committee.

With the establishment of the Tanker Advisory Committee the war-time machinery for administering oil and tanker affairs took its final shape. This tightening of Government control came at the end of a period of growing doubts among shipping officials about the handling of tankers by Shell-Mex House under the auspices of the Petroleum Department. Behind these criticisms lay feelings of insecurity that a large sector of British shipping was functioning outside official control. In some quarters there was resentment at the self-confidence and self-sufficiency with which the oil industry appeared to conduct affairs. There were also more solid grounds for

<sup>1</sup> The Ministry of Shipping was absorbed into the Ministry of War Transport in May 1941.

complaint. The advantages and disadvantages of holding tankers as a mobile reserve in the summer of 1940 were finely balanced. But it is certainly arguable that tankers in the Atlantic trades were reinforced more slowly than they should have been in the latter part of 1940. The Oil Control Board itself was of this opinion when it looked back in January 1941. The fact was that during a period in which tankers were queuing up to unload at British west coast ports it was easy to overlook, in the midst of this congestion, that the number of arrivals had begun to fall off.

Identifying these two distinct causes of the imports decline in late 1940—port congestion on the one hand, reduced arrivals on the other—was made more difficult by the continuing absence of any governmental statistics on tankers and tanker movements. Of all defects in the Government's oil control machinery, the absence of these statistics was probably the most important during the first eighteen months of the war. This defect began to be corrected in the spring of 1941. Beginning in April 1941 the monthly figures of oil stocks, imports, consumption and home production—which the Oil Control Board had been receiving from the Petroleum Department since the outbreak of the war—were supplemented by monthly returns from the Ministry of Shipping showing tanker availability, employment and performance.<sup>1</sup> The availability of these statistics helped to complete the evolution of the governmental machine from a watching to a controlling function.

One other administrative development which followed the events of mid-1940 may be conveniently recorded at this point; it affected the bunkering of oil-fuelled merchant ships. It will be recalled that control over bunker issues had been seen before the war not only as a way of reducing the demand for oil supplies (and thus of tankers) but also as a means of controlling the extent to which neutral ships were employed in trades prejudicial to Allied interests. As it happened the instrument for the control of neutrals—a system of Ship Warrants<sup>2</sup>—was not introduced until most of the maritime nations had ceased to be neutral anyway, and at that time Britain was in no position to take a high hand with the remaining neutrals. Ship warrants were never used against either the Americans or the Japanese, and the inter-departmental Bunker Control Committee,

<sup>1</sup> In January 1941 the Central Statistical Office was established as a branch of the War Cabinet Secretariat. Beginning in September 1941, the Central Statistical Office began issuing a monthly digest of statistics 'relating to tankers and petroleum products' drawn from both the Petroleum Department's statistics and those from the Ministry of War Transport.

<sup>2</sup> Ship warrants entitling their holders to make use of British-controlled bunkering facilities were issued to shipowners who signed an undertaking not to allow any of their vessels to make voyages prejudicial to Allied interests without obtaining a certificate or 'navicert' allowing them to do so. The scheme formally came into effect on 23rd August 1940.

which had been set up in 1938<sup>1</sup> (in large part to help operate the warrant scheme), never met after August 1940

The demise of the Bunker Control Committee left another aspect of bunker control—that of determining the pattern of bunkering by British-controlled ships—to a purely departmental committee operating within the Ministry of Shipping. This committee was aided by a Bunker Liaison Office established by the oil companies at the outbreak of war to co-ordinate the supply of bunkers. The Office took the place of the intended governmental Bunker Advisory Committee which had been provided for in the pre-war plans<sup>2</sup> to assist the Bunker Control Committee on this side of its work. The successor Bunker Liaison Office survived until the end of 1942, when Allied landings in North Africa showed up the disadvantages of having the bunkering agency outside the governmental machine while secret shipping movements were being organised. Accordingly, in February 1943, the Bunker Liaison Office was absorbed—as the core of a new Oil Bunkering Division—into the Ministry of War Transport (which had by then absorbed the Ministry of Shipping). The Oil Bunkering Division continued to operate in this framework until the end of the war.

(iv)

### The Civilian Consumer

On the home front a most notable feature of the autumn and winter of 1940 was that these months of falling stocks and imports should have passed without any reduction in the petrol allowances granted to non-essential consumers. This forbearance might seem hard to understand when recalling that there was strong criticism within the Government itself, during the summer months when stocks were rising, about the amounts of petrol being consumed by private motorists. The winter of 1940, moreover, was not only a period of dwindling stocks but also a time when essential demands for petrol were mounting steadily. There was increasing consumption by fire and civil defence services; by 'industrial users' such as engine manufacturers, building contractors working on airfields or other vital constructions; and by farmers whose vans and lorries exclusively licensed for agricultural use rose by over 40 per cent. between the outbreak of war and May 1941.

On the other hand, there were far fewer private motorists in 1940 than before the war, and the savings from petrol rationing had

<sup>1</sup> See pp. 42-43.

<sup>2</sup> See p. 43.

exceeded expectations. Against this background the authorities had felt able to grant concessions. In July 1940 a special petrol allowance worth 300 miles of travel had been introduced to cover home-leave for servicemen. This allowance was for members of the Armed Forces and the merchant navy on leave from service abroad (or afloat), or from operational flying over Britain: the concession was continued throughout the war but was limited to two such allowances every twelve months. Later in the autumn of 1940 when air raids began to interfere with public transport, an extra ration was allowed to London taxicabs. During October and November 1940 motorists who lived in the London area and were only eligible for the basic ration, were given 150 miles worth of extra coupons a month to cover travel to and from work where public transport had been disrupted. In November 1940, under the 'Help your Neighbour' scheme, motorists living within twenty miles of London were able to get extra petrol for travel to work provided they could carry a full load of passengers. By the end of that month it was estimated that between fifty and sixty thousand people were being taken to work daily at a cost of under a thousand tons of petrol a month.<sup>1</sup> The scheme continued until the end of March 1941. While it lasted, private motorists in raided areas outside London also received additional petrol provided they carried the additional passengers.

Meanwhile during January 1941 had come signs of a hardening mood within the Government. Total oil imports that month were under 450,000 tons—even less than had been imported during the disruptions of September 1939. On 17th January the Chancellor of the Exchequer, Sir Kingsley Wood, wrote to the Chairman of newly-formed Import Executive,<sup>2</sup> asking that pleasure motoring should be judged from the point of view of its effect on the climate of opinion, and not solely by its cost in dollars and tanker space—which was admittedly small. This initiative, like that of Mr. Greenwood in June 1940, came to nothing. The Petroleum Department rejected the implied invitation to cut private car basic rations as firmly as they had when stocks were high and tankers in surplus. The Department still believed that conspicuously wasteful consumption on the roads could be traced to abuse of supplementary coupons, and it was trying to check this abuse by appeals to patriotism and by a strengthening of its enforcement machinery. The Department also

<sup>1</sup> Normally Regional Petroleum Offices worked on the principle that supplementaries could not be granted for journeys which could reasonably be undertaken by public transport.

<sup>2</sup> The Import Executive was set up in January 1941 to explore the whole import situation, the rival claims upon shipping of military strategy and imports and priorities between different classes of imports—and to secure co-ordination between unloading at the port and inland transport. See W. K. Hancock and M. M. Gowing, *op. cit.*, Ch. VIII.

argued that a cut in the basic ration would inflict 'very serious hardship' and would also discourage persons who volunteered the use of their cars for war work from continuing to license these vehicles. This view carried the day with the Lord President's Committee,<sup>1</sup> which considered the question in February 1941.

Given this lenient approach to private motoring it was hardly to be expected that the rationing of commercial road vehicles would have been unduly stringent. In pre-war plans it had been hoped to shift much of the work of long-distance haulage from the roads to the railways; and with this in mind the Ministry of Transport had striven to curtail petrol supplies to long-distance road hauliers after war broke out. But it did not press curtailment very hard against the strong opposition of the industry. Indeed, in March 1940 the Oil Control Board agreed that the motor fuel allocation for goods haulage should be raised from the planned 75 per cent. to 81 per cent. of pre-war consumption; four months later in July it was raised again to 90 per cent.<sup>2</sup> The diversion of imports reinforced this trend. Instead of the railways taking over from the road hauliers, it was the hauliers who had to help out the railways in local distribution and in clearing goods away from the congested west coast ports.<sup>3</sup> By the middle of 1941 there were more vehicles engaged in long-distance road haulage than before the war.

Although some expansion of road haulage operations was clearly unavoidable after the middle of 1940, the industry nevertheless came under attack for the amount of motor fuel it was using. Two main criticisms were made. First, it was claimed that services were continuing which could have been eliminated, such as many retail deliveries. Secondly, it was said that those operations which were necessary were carried out in a way which was wasteful of fuel. In July 1940 Shell-Mex House wrote a critical account of deliveries by retailers' vehicles, citing cases of 'incompletely loaded vehicles covering the same routes daily' and of 'vehicles making deliveries over a route every day of the week when one or two deliveries a week would fulfil requirements'. Early in 1941 Shell-Mex House extended its criticism to other haulage operations. There had been, it said, citing the Ministry of Transport as its authority, little attempt by the 'Groups' of operators to rationalise their activities. Nor was Shell-Mex House the only critic. The Food Minister, Lord Woolton, was to complain of wasteful cross-traffic in food distribution later in the

<sup>1</sup> The Lord President's Committee, set up in June 1940 under the Lord President of the Council, had inherited the responsibility for 'large questions of economic policy' formerly held by the Economic Policy Committee. See W. K. Hancock and M. M. Gowing *op. cit.*, Ch. VIII.

<sup>2</sup> C. I. Savage, *op. cit.*, Ch. IV and VIII.

<sup>3</sup> C. I. Savage, *op. cit.*, Ch. VIII.

year. The fact was that the attempt to control road haulage operations through the granting or withholding of fuel supplies was proving relatively ineffective. For one thing, operators were still receiving the equivalent of 50 per cent. of their pre-war consumption in the form of a basic ration. This ration was supplemented by discretionary issues, a third of which were dispensed by Group Managers—who were road hauliers themselves. ‘Little more than dispensers of motor fuel rations’ was the comment of Shell-Mex House on the way these Group Managers carried out their rationing duties.

The Ministry of Transport was well aware of the need for tighter control over road hauliers. Ever since the spring of 1940 it had been working to secure a more positive method—such as had been envisaged before the Munich crisis<sup>1</sup>—for directing the industry’s war-time operations. But this effort was made for administrative reasons rather than to save fuel. Indeed, the Ministry of Transport thought that scope for fuel economy in road transport was being exaggerated. The expansion of long-distance road haulage had taken place in response to a demand which the railways could not meet by themselves. As for retail deliveries, the Ministry could have pointed to impressive savings here. In the pre-war years retail vans had accounted for no less than 50 per cent. of the motor fuel consumed in commercial haulage operations; and it had been planned to reduce this proportion to 33 per cent. In fact, in December 1939, retail deliveries accounted for under 22 per cent. of petrol consumption for road haulage. By the middle of 1941 the proportion had fallen to less than 17 per cent.<sup>2</sup> But quite apart from the merits of this statistical case the Ministry would not contemplate the possibility of cutting the commercial ‘basic’ while the private car ‘basic’ was still in existence. Echoing an argument used by the Petroleum Department, the Ministry of Transport said that to cut the commercial ‘basic’ might force many road haulage vehicles out of commission.

When the winter supply position was at its worst, however, the Ministry did consider whether there might not be room for economy on the passenger side of the transport industry. Here there was no question of motor fuel being wasted through lack of co-ordination, or private irresponsibility. Although bus and coach operators received what was called a basic ration, they could only use it for services that had been specifically authorised. The only question arising was a policy question: namely whether too many bus and coach services were being allowed to continue. The Ministry was inclined to think this was so. At the outbreak of war many regular

services—especially long-distance coach services—had been abolished as an economy measure; only about 20 per cent. of them were still continuing in 1941. But many excursion services were allowed to continue because they were considered good for morale; and in the summer of 1940 extra fuel allowances had been granted for recreational coach trips—and recreational boating. It was these recreational allowances that the Ministry of Transport, in February 1941, suggested might be reduced. The Ministry was told, for its pains, that such reductions would be ‘most undesirable’. The Lord President’s Committee took the view that, while pleasure motoring in private cars was still permitted, it would be clearly unjust to take action against pleasure outings in public vehicles. The logic of this position can hardly be denied.

Thus it happened that the winter of 1940–41 passed by without any practical steps being taken apart from a Ministerial appeal for economy on the radio—to reduce the consumption of petrol, or, indeed, of any other oil product—with one exception: bunker oil. Offtake of oil bunkers at United Kingdom ports had been running at a high level since the end of the previous summer. This had been due to changes in shipping routes. With the closing of the Mediterranean a great stream of shipping had been diverted round the Cape of Good Hope, and this had laid an extra burden on bunker stations on and near the west coast of Africa—which had hitherto only had to cater for vessels bound for South Atlantic ports. The strain imposed by re-routeing was enhanced when the big French bunker port of Dakar ceased to be available to the Allies. At the beginning of September 1940 all vessels bound for ports in South America or South Africa were instructed to take on sufficient bunker oil in Britain to reach their destinations without refuelling *en route*; and bunker offtake from United Kingdom ports rose by some 3,000 tons a week. This directive remained in force throughout the period of port congestion and the subsequent falling off in tanker arrivals. Meanwhile the port of Freetown was hurriedly converted into an emergency main bunker station by making over naval storage there to civil use and supplementing it by tankers permanently anchored to act as floating oil installations. By February 1941 the Ministry of Shipping felt able to revert to its former bunkering policy to strengthen United Kingdom stocks. On the 4th of that month a new circular to shipowners directed them to bunker their vessels to the maximum extent away from this country.

<sup>1</sup> An account of this is given in C. I. Savage, *op. cit.*, Ch. VIII.

<sup>2</sup> C. I. Savage, *op. cit.*, p. 304.



(v)

## Coal Tar Oils

It would be harsh to condemn the oil authorities for refusing to make small savings in imports by cutting supplies to the civil population during this dark second winter of the war—when air bombardment, and the other consequences of military defeat, were putting the confidence and morale of the British people to a searching test. This refusal reflected the considered judgment of men who were by no means inactive in other ways in the search for import savings. The autumn and winter of 1940 saw a change of some importance in the policy adopted in the early war weeks of promoting tar products as a fuel for industry. Hitherto attention had been focussed on the burning of creosote oil; now it was on the burning of pitch, the residual product of tar distillation. Technically it was possible to burn creosote and pitch in a fifty-fifty mixture as a fuel oil under furnaces; practically it was desirable—even necessary—to do so for two reasons. First, it offered the prospect of a further useful import saving. Early in the war the authorities had aimed at diverting 250,000 tons a year of creosote to the fuel oil market; by using a creosote-pitch mixture they could expect to double the saving that could be made by substitution. Secondly, burning pitch mixed with creosote would provide an outlet for a product which was becoming an embarrassment to the tar distillers in the later months of 1940. In normal times much of the pitch produced in Britain was exported to France where it was in demand for making briquettes (bricks made of pitch and coal dust and used as household fuel and as fuel for locomotives). When their French market disappeared in June 1940 stocks of pitch at British tar distilleries accumulated to such an extent that they threatened to bring the industry to a halt; and this would have had disastrous consequences for gas and coke production.

The adoption of creosote-pitch as a fuel oil was followed by an important administrative change. Hitherto the supply of tar fuel oils had been completely unco-ordinated. The tar distillers had negotiated individually with the Petroleum Board which distributed the tar fuel oils to its customers in the same way as it distributed petroleum fuel oils. As a result the Board was faced with numerous and conflicting requests from distillers to take away their products. In the absence of an overall production programme there was, of course, no way of judging which of these requests, if any, should be given priority. The tar distillers, for their part, were at an equal loss in appraising the relative importance of the demands laid upon them. Clearly there was need for a body to co-ordinate the supply of tar oils

in a programme which could take account of the many demands for them for other purposes than burning as fuel.<sup>1</sup> As the autumn of 1940 wore on the tar distillers became convinced that there would be no way out of their difficulties if they were left to their own devices. What was needed was centralised direction. The Government, after some initial reluctance, became convinced that this would have to be government direction.

Accordingly, at the formal request of the tar industry, the Government created a new body, the Coal Tar Control, in November 1940. The Control was constituted as an integral part of the Mines Department, but was mainly staffed by experts from the coal tar industry. Its headquarters was established in Leeds, in the heart of one of the main centres of tar distilling. On the recommendation of the industry Major T. Knowles, of Monsanto Chemicals Ltd. (which owned a small tar distillery) was appointed Controller. He filled the post for the rest of the war.

The new Coal Tar Controller derived his powers from the authority conferred on the Secretary for Mines by a new Control of Coal Tar Order, which came into force on 1st February 1941. This Order required securing a licence from the Mines Department in order to carry on the production, distillation, blending or dealing in coal tar and its products (except benzole and its constituents which was of course already controlled under the Petroleum Orders). The Order also gave the Government power to lay down what should be blended or distilled.<sup>2</sup>

The function of the Coal Tar Control was to plan the production of the various coal tar products, including chemicals, so that these were available in the right amount at the places where needed. The Control looked after all arrangements for supplying the Petroleum Board with tar fuel oils and fixed the prices which were to be paid.<sup>3</sup> In planning production, the Controller of the Coal Tar Control was assisted by a National Advisory Committee consisting of members chosen by the Controller from nominations of the industry. This committee acted as a bridge between the Tar Control and committees of the tar industry which were each concerned with separate tar products.

<sup>1</sup> No less than eighteen Government departments were concerned with the supply or use of tar oils.

<sup>2</sup> S.R. & O. 1941 No. 81. Amended by Control of Coal Tar Order, 1942 (S.R. & O. 1942 No. 732) and Control of Coal Tar (No. 2) Order, 1942 (S.R. & O. 1942 No. 2136). The later Orders exempted purchasers of up to fifty gallons from the need to hold a licence and tightened up the control by enforcing the registration of wholesalers.

<sup>3</sup> Since May 1940, the prices paid by the Board to the distillers for tar fuel oil and the price charged to consumers had both been related to the prices of petroleum fuel oil, allowance being made for lower calorific value, costs of carriage and the Board's commission. After the middle of 1941 they were determined by what the tar industry and the Controller considered a fair price.

The Coal Tar Control was not the only new body set up in 1940 to foster the production of tar products. Following the report of the Pratt Committee<sup>1</sup> the Secretary for Mines appointed an Advisory Committee on Benzole Recovery under the chairmanship of a prominent member of the gas industry, Mr. George Evetts. Its function was to persuade the industry to raise its benzole output and to offer advice to gas undertakings on the best means of doing this. During the later months of 1940 and of early 1941 the Evetts Committee considered the circumstances of each gas undertaking individually. It did not press for the installation of new recovery plant where benzole recovery would cause 'serious technical difficulties or severe financial loss' (defined in practice as a loss greater than the equivalent of one-tenth of a penny per therm on the price of gas). Even so, the results were good enough to justify the Government's decision not to use compulsion. By the end of 1940 forty-two gas undertakings had been persuaded to install benzole recovery plant; by the summer of 1941 eighty gas undertakings had agreed either to install recovery plant for the first time or to replace old plant with plant capable of greater output. Steel and labour were hard to get, however, and there were delays in building; only one of these new plants came into operation before the middle of 1941.

Meanwhile war conditions in the winter of 1940-41 worked against efforts to raise the output of existing recovery plants. Carbonisation plant at both gasworks and coke ovens was put out of action by air raids. In September 1940 the rate of benzole production at gasworks fell to a mere two-thirds of what it had been at the outbreak of war. Later it recovered, but as the demand for gas began to rise and coal became harder to procure, gas undertakings became chary of using their benzole plant. The authorities made special efforts to keep up the volume of coal supplies to the gas industry; but the quality of the coal deteriorated so that the gas yield per ton of coal carbonised grew smaller. Some gas undertakings, stretched to the limit to meet the demands for gas, stopped using their benzole recovery plants altogether at the beginning of 1941. Production of benzole at coke ovens, which had risen in 1940, also began to suffer as a result of the damage caused by air raids and the low quality of the coal they were receiving. The difficulty of blacking out the ovens meant that work had to stop during alerts in the hours of darkness. This was a serious cause of delay in the winter season. In fact in the first six months of 1941 less benzole was produced from coke ovens than in the first half of 1940.

<sup>1</sup> See p. 97.

(vi)

## Oil Storage

Benzole recovery plant was not the only new construction put in hand to help oil supply in the second winter of the war. At the beginning of 1941 the authorities decided that new oil storage was needed in addition to that still being built under pre-war programmes.

A little unexpectedly, perhaps, it was the civil authorities who were first to come forward. Late in 1940 the Petroleum Department put up a plan to the Oil Control Board for the construction, at Government expense, of partly-buried tankage able to hold 125,000 tons of oil products. They did so in order to make good the loss of storage space incurred as a result of enemy bombing. The Oil Control Board signified its approval in January 1941; later it sanctioned a further 30,000 tons to make up for further losses.

Meantime, hard on the Petroleum Department's first request, the Oil Control Board had found itself faced with demands from both the War Office and the Air Ministry. Actual experience of war and the strategic rethinking forced upon them by the events of mid-1940 had led both military Departments to revise their requirements for stocks and storage. The Air Ministry, for example, found that it had to make an allowance for working ullage (the unoccupied space which has to be preserved in oil storage to provide for differences in the rates of offtake and supply) which it had not taken account of in its pre-war programmes; it put in for an additional 140,000 tons of storage capacity. The War Office asked for 120,000 tons to be provided by the end of 1941, and another 40,000 tons by the end of 1942. On top of these requests, in February 1941, a proposal to improve storage and other facilities in the Bristol area came before the Oil Control Board.

With building capacity strictly limited, the Board felt a need for some reinforcement to help it assess and reconcile these various requirements. It therefore set up a new sub-committee, which came to be known as the Storage and Development Sub-Committee. Chaired by a Petroleum Department official, this sub-committee included representatives of all three Service departments as well as technical experts from the oil industry. Meeting for the first time at the end of February 1941 the sub-committee took over the work of examining and reporting on all projects for building oil storage, pipelines and port facilities in Britain during the remainder of the war.

The Storage and Development Sub-Committee soon justified its

existence, for it was able to provide for all the new storage needs of the two Service departments without having to recommend any new construction work. War Office needs were met by allocating to the Army some of the storage still being built under the pre-war programmes on behalf of the Petroleum Department that happened to be conveniently sited near Army container-making plants. Acceptable commercial tankage was also found. The Air Ministry's need was met some weeks later by the handing over of a large block of new storage that had been constructed in association with an abandoned project for a new refinery on the west coast.<sup>1</sup>

It may be asked why, when Service requirements for storage could be met from existing facilities, new building continued on behalf of the civilian authorities? The fact was that more than a wish to replace lost tankage had been behind the Petroleum Department's initial request. There had also been a purely 'distributional' need to provide extra tank capacity in the western half of the country to cope with the considerable expansion of oil traffic there that had followed from diversion of shipping. In choosing the sites for its new storage the Department took account of this need. Out of a total of 150,000 tons storage capacity erected under its 1941 programme, a third was sited at ports on the west coast (Barry and Liverpool) where white oil cargoes could not have been discharged without the provision of new tankage. The rest was located at points inland (Gloucester, Worcester, Stourport and Aldermaston) which were key points in the distribution network—and also within easy reach of areas of large consumption that might have been hard to supply directly from the ports if the transport system were disrupted by air raids.

## CHAPTER VII

### THE ECONOMY PROGRAMME

(i)

#### The Worst Months Yet

**D**ESPITE the disappointments of the previous six months, the mood of the oil authorities was decidedly optimistic in February 1941. They believed that they had seen the worst of the crisis; with the ports now working more smoothly there was reason to hope that the normal seasonal improvement in tanker carrying capacity would soon be reflected in increased supplies. In spite of everything, imports between September and February had averaged more than in the comparable period of 1939–40; the big import recovery which had marked the spring of 1940, might also be bettered in 1941. In the middle of the month the Oil Control Board reviewed the supply prospects for the rest of the year. Its conclusions were reassuring; it thought that the import programme could be met with the tanker strength available, provided the other Empire countries pruned their requirements. This those countries were being asked to do.

This was the background against which the Lord President's Committee took the decision in February 1941 not to reduce the petrol allowances for private motoring and excursion trips. In the same spirit of confidence the Government at this time took an even bolder gamble: the reversal of the 'short-haul' policy adopted in December 1940. On the recommendation of the Oil Control Board's Executive Committee, but against the advice of Shell-Mex House, the switching of tankers from the Persian Gulf run to the western hemisphere supply route was halted while the possibility was examined of finding new outlets east of Suez for Iranian oil. Basically this was a political decision in which the Prime Minister himself was much interested.<sup>1</sup> Relations with the Shah were never easy and, given the delicacy of the British position in the Middle East generally

<sup>1</sup> See below p. 273 *et seq.*

<sup>1</sup> Winston Churchill, *The Second World War*, Vol. III, p. 656, minute Prime Minister to Secretary for Petroleum, 21st February 1941 (Cassell & Co. Ltd., 1950).

at the start of 1941, there was an understandable anxiety to find ways of keeping him contented.

Confidence in oil supply prospects began to wane, however, in the weeks which followed this decision to continue imports from Iran. Tanker performance in March and April 1941 was much below normal for that time of year. The north Atlantic winter had placed a great strain on ships and crews. There were frequent engine breakdowns, for the vessels were not serviced in war-time as often or so thoroughly as in time of peace. Degaussing equipment on tankers was more easily damaged than on other types of ships, since it had to be fitted on the outside. This equipment suffered badly as the vessels sailed far to the north of their normal routeing in the teeth of Atlantic gales. To make matters worse, many of the tankers had been hastily fitted out on a temporary basis. It was not unusual for a tanker bound for Britain to miss its convoy at Halifax because it needed repairs to its degaussing equipment; to be diverted into Belfast on the homeward run for further repairs to that equipment, and then to miss the outgoing convoy from Britain while its degaussing equipment was once again repaired. Not less important was the strain on the men who had to bring these dangerous cargoes through the north Atlantic weather in the face of attacks from submarines and aircraft and, in the new year, from German warships as well. Between the middle of February and early April 1941 sixty-one tankers failed to depart on schedule, reportedly owing to equipment breakdowns or other unavoidable delays. In many cases it was suspected that these explanations masked other failings.

On top of these delays came a sharp rise in tanker losses. Between January and March, thirteen tankers were sent to the bottom by German surface ships alone. March was a particularly bad month, with nearly as much British-controlled tanker tonnage lost as in the whole of the first nine months of the war. April was nearly as bad, with losses around Greece and Crete added to the heavy toll in the North Atlantic. The Oil Control Board's February forecast had not anticipated sinkings on this scale.

By late March the Government was alarmed. The redeployment of the tanker fleet, suspended in February, was hastily resumed. More tankers were withdrawn from Empire trades and on 24th March the Oil Control Board gave its formal sanction to the principle that tankers should work only on the shortest supply routes. Shipments to Britain from Iran were ended. By the end of May all but five of the forty-odd tankers that had been sailing between Britain and Iran in February were switched to the Atlantic routes—without, it would appear, overt protest from the Iranians. The last war-time oil cargo to be shipped from Abadan to Britain arrived in this country in August 1941.

But tanker redeployment had been a late decision and now appeared insufficient to redress the situation. A new calculation indicated that at least 750,000 deadweight tons in additional tonnage would be needed to meet oil supply commitments down to the end of the year. Once more the British authorities looked to the Norwegians. Despite the large number of Norwegian tankers brought under British control the previous year, a considerable number had remained working outside the British programme. In March 1941, after protracted negotiations, a second 'Memorandum of Agreement' was signed by the two governments. This Agreement provided, however, for only 50,000 deadweight tons of tankers, and three whalers, to be time-chartered to the Ministry of Shipping. The remaining tankers were harder to secure, for the Norwegians had a problem of their own. Unlike the exiled Dutch and Belgian governments, the Norwegian government-in-exile had no colonial territories at its command, and depended for revenue on the earnings of the Norwegian merchant fleet. For this reason it wished to keep a proportion of that fleet in safe neutral trades, and especially in trades where it could earn United States dollars needed, *inter alia*, for the servicing of American loans. The Norwegians were therefore unwilling to allow dollar-earning vessels to be drawn into war service for Britain unless those dollar earnings could be made good.

Apart from the Norwegians there were also Belgian tankers promised under the Belgian War Shipping Agreement.<sup>1</sup> Of these only 40,000 deadweight tons had yet come into British war service. This was not the fault of the Belgians, but of the American owners of the vessels who, in order to circumvent the Belgian requisitioning order, were trying to transfer them to Panamanian registry. In March 1941 this very issue was before the American courts. There was also a large bloc of Panamanian-flag tonnage, under American ownership, which was contributing little to the British oil programme. None of these Panamanian tankers had sailed to Britain since the middle of 1940; two or three had been hired by Shell-Mex House to work in its new Shuttle service along the American eastern seaboard<sup>2</sup> and there were one or two Panamanians working on Empire routes east of Suez. The British government would have liked to see more Panamanian tankers in these safe eastern cross-trades, which were now being denuded of British-controlled vessels.

The evidence pointed to one conclusion: if Britain was to get the extra tankers she needed to see her through to the end of the year—let alone through the years to come—she would need help from the American government, help with ships as well as help with dollar

<sup>1</sup> See p. 128.

<sup>2</sup> See p. 162.

currency. In April 1941 the British decided that the time had come for a direct appeal to the United States government—with results that will be described in Chapter VIII.

Meanwhile there were things which Britain could do for herself to alleviate her position—indeed, things that she would have to do if her appeal to the Americans was to carry conviction. On 24th March the Oil Control Board made a dramatic gesture. It decreed a cut of a million tons a year in the rate of oil imports, and asked the Service departments and the Petroleum Department to work out plans for import savings. In the short run the relief such a programme could give would be only marginal; it was reckoned to save about 20 out of 378 tankers used on the United Kingdom import programme. But its value lay in what it stood for. Apart from any effect on American opinion the import cut offered a demonstration to the Empire governments—then suffering from the withdrawal of British-controlled tankers from their own supply programmes—that Britain was not falling behind in austerity. It also reflected pressures within the British government itself. Under the reorganised tanker control system the oil authorities found themselves challenged to justify the use to which they were putting the tanker fleet. The Ministry of Supply wanted tankers to bring in molasses for cattle feed and the manufacture of industrial alcohol. More tankers were also wanted to carry animal and vegetable oils needed for cooking fats and soap: above all, the Ministry of Food was making a strong bid for tankers to supplement the dry-cargo grain fleet. By March 1941 there were four tankers already in grain service. The oil authorities were opposed to this use of tonnage as they had been the previous summer. But now it was the Ministry of Shipping which had the final say on tanker utilisation; and they were guided on import priorities by the newly-created Import Executive.<sup>1</sup> In arguing their tanker requirements before the Import Executive the oil authorities had to show that their import programme had been pruned and provided for only essential demands.

Suggestions for cutting import programmes were submitted to the Oil Control Board at the beginning of April 1941. The Board amended them slightly and passed them on to the Lord President's Committee. Most of these suggestions were then sanctioned by that committee on 18th April. More than half the savings were to come from the relatively simple expedient of allowing Service stocks to fall, or postponing additions to Service stocks until the end of the year. The Service departments also promised cuts in consumption. They were well-placed to make these offers. Their supply programmes had not suffered so much from the shortfall in tanker arrivals as had the

Petroleum Department's imports on civil account. (Indeed, in April 1941 stocks of aviation spirit were actually above the approved target level). The civil import programme had to be pared down partly by cuts in civilian consumption, and partly by pressing on more vigorously with the use of home-produced substitute fuels. These measures form the subject of the rest of this chapter.

(ii)

### Motor Fuel Economy

Confronted with the necessity to reduce imports for civilian use the Petroleum Department decided that consumers of motor fuel would be able to contribute the biggest saving. So far they had been far from harshly treated. In April 1941 all car owners were still allowed forty miles of free driving a week, on top of which they could draw extra allowances if they used their cars for a public purpose, or even for their private business affairs. Vans and lorries could be driven for up to 170 miles a week on pleasure outings.

Nor was there any check or limit on the use of petrol by the Armed Forces, though little or none of this was used in support of 'active operations'. The Army, which was by far the largest petrol user of the three Services, was consuming four times as much petrol in the spring of 1941 as it had done twelve months earlier; between January and June it was to consume more than 75 per cent. of the amount used by all the private motorists in the country. The increase was, of course, associated with the expansion of the home-based Army, and its growing degree of motorisation. Even so there was a general impression that the Forces were rather too free and easy with their petrol supplies.

Nevertheless the War Office reacted stiffly to the Oil Control Board's request to make savings in motor fuel. The War Office said that the Army could only do so at the expense of training, and that this could not be tolerated. Later, however, the War Office agreed to a flat cut of 10 per cent. on supplies to Army units in Britain on condition that military training was not interfered with. The Royal Air Force and the Navy, which used petrol for some of its small craft as well as for land transport, also agreed to economise.

In agreeing to these economies the War Office had observed, rather tartly, that the large number of civilian vehicles on the roads might well have 'created the impression in the Army that economy is not of vital importance'. Indeed evidence was growing that the

<sup>1</sup> See p. 168.

soldiers were not alone in their 'impression'. The general public, kept in the dark about the tanker shortage and the fall in oil stocks, was not as economy-minded as it might have been. Short of enlightening the public with these facts—which would have invited a concentrated enemy attack on Britain's oil installations—the Petroleum Department itself was coming around to the view that cuts in civilian motor fuel rations would be the best way of influencing public opinion. The Department was ready, in April 1941, with its economy proposals. These were: to impose flat cuts of 20 per cent. in the next issue (which would cover the period beginning 1st June) of supplementary coupons to semi-essential private motorists, including hire cars;<sup>1</sup> to make flat cuts of 10 per cent. in issues of 'essential' coupons; to cut 'industrial' coupon issues by 10 per cent.; and to cut issues to farmers for their vans and lorries (excluding supplies for machines working directly on the land), by 20 per cent. and issues to the police and local authorities by 10 per cent. All these measures were adopted and came into effect at the beginning of June 1941.<sup>2</sup>

This programme, which left the ordinary motorists' basic ration intact while cutting allowances for special consumers, aroused fierce public criticism. All priority consumers felt a sense of grievance; the semi-essential motorists, in particular, were outraged at seeing allowances, on which their livelihood had depended, reduced while other car owners, who appeared to have no claim whatever for special treatment, were left untouched. In fact the Petroleum Department had originally intended to cut the 'basic' by half; and as recently as February had argued that, if a cut was to be made at all, the basic ration was 'the only substantial and reasonable field' for it. However, the Department had decided to cut priority issues in the face of new evidence about the source of the petrol that was still conspicuously wasted by some private motorists. Formerly the Department had attributed this wastage to the misuse by motorists of their supplementary coupons. Now it believed that motorists were also getting extra supplies through cashing excess industrial, farming and commercial coupons. The flat cuts on these issues were intended to squeeze out this excess. Farmers and others were told that they could have their cuts restored in full on appeal if they could show that vital work had been curtailed or hampered as a result of them. The cuts in allowances for essential services were also defended on the grounds that they would heighten public awareness of the need for economy far more than cuts anywhere else.

<sup>1</sup> Subsequently the cut in supplementary issues to hire cars in the provinces was fixed at 10 per cent. One reason for this differentiation was that, in the provinces, private hire cars largely perform the functions of taxis, and taxi rations were being cut; another was that in some provincial areas it was easy to transfer vehicles from the private hire to the taxi category and this was thought to be more likely to happen with a 20 per cent. cut.

<sup>2</sup> The 'dealers allowance' was also reduced from 2 per cent. to 1 per cent.

As for the failure to cut the basic ration, the Petroleum Department had changed its mind for purely administrative reasons. Cutting the 'basic', it foresaw, would provoke a flood of applications for special allowances to meet a variety of domestic purposes—taking children to school in rural areas, for instance—for which the 'basic' had hitherto been used. These domestic needs were genuine enough and would have to be provided for; but, stemming from a wide multiplicity of individual circumstances, they would be 'entirely beyond the power of a Regional Petroleum Officer or anyone else' to assess adequately. The Regional Petroleum Offices would have found it 'absolutely impossible' to deal with these applications simultaneously with the appeals against the cuts in supplementaries that would also come flooding in upon them.<sup>1</sup>

The programme of cuts in allowances to motorists was accompanied by cuts on commercial users. The basic ration for lorries and vans was reduced by a sixth from 1st July 1941. The Ministry of Transport also reviewed its February proposal to cut down summer recreational coach services; and offered to consider pruning the surviving long-distance express coach services, most of which had been kept running because there were no alternative rail services which were not inconvenient or liable to disruption. The Lord President's Committee decided in favour of 'drastic cuts' in the express services and 'smaller' cuts in the summer pleasure services. Henceforth fuel was only granted for recreational services which catered primarily for war workers and members of the Forces.

Before leaving the subject of motor fuel economies it should be noted that only the users of road vehicles were restricted in their supply of motor fuel. Diesel oil used in stationary engines, in small marine craft and in locomotives, remained available according to need; so too did 'vaporising oil'—that is paraffin with 'anti-knock' characteristics—used in farm tractor engines and fishing boats.<sup>2</sup> The consumption of vaporising oil over the first half of 1941 was more than twice the 1938 rate. This was due, of course, to the national food production drive. However, the fact that this product could be obtained on demand even after issues of farmers petrol coupons had been cut may have led to waste by encouraging the use of paraffin-driven tractors for transport and general haulage work.

<sup>1</sup> Provided that they were accompanied by an effective economy appeal and a plea to consumers to think carefully before appealing, Rationing Division of the Petroleum Department calculated that the approved programme of cuts on priority users would give rise to 365,000 appeals, requiring the services of 215 extra clerks between the 15 Regional Offices and another 90, of higher quality, to deal with 'industrial' appeals. The abolition of the basic ration would have added another 800,000 appeals.

<sup>2</sup> The consumption of the fishing fleet was 15,000 tons in 1938 and 7,000 tons in 1940 when fishing was curtailed by dwindling manpower and the presence of mines in coastal waters.

(iii)

### Heating and Furnace Fuels

The economy programme of April 1941 also included restricting supplies of burning oil, that is paraffin used for heating and lighting. The demand for this product had been rising steeply because of the growing shortage of household coal. With approval of the Lord President's Committee the Petroleum Board was instructed to restrict paraffin deliveries to dealers to 80 per cent. of the level obtaining during the corresponding period of 1940. This cut took effect from 12th May 1941. It was accompanied by press and radio warnings about the need to use paraffin carefully; later a circular letter over the signature of the Secretary for Petroleum was sent to all retailers explaining the need for economy and enclosing a placard for them to put up in their shops. Local authorities and commercial consumers also received a letter asking them to avoid wasting paraffin or using it unnecessarily. However the requirements of the public services continued to be met on demand, and hospitals, together with manufacturers who could show they needed it for essential work, also received specially favourable treatment; because of such exceptions the actual decline in deliveries to the market proved to be only 11 per cent. The brunt of the cut was therefore borne by household users of paraffin.

The decision to cut the public's supplies of paraffin at a time when demand was on the rise, promised to create exactly the sort of conditions that called for rationing or other means of control. For there was a risk that those who really depended on domestic paraffin would go short when the colder weather began again. Before the war the Petroleum Department had considered, and rejected the idea of a full-scale coupon rationing scheme for paraffin. Now the Department considered and rejected it again on the grounds that it was impracticable. Paraffin, it pointed out, was a commodity 'bought in quantities varying from  $\frac{1}{4}$  pint to 10 gallons by all classes of the community, alone or with a  $\frac{1}{2}$  lb. of tea, for innumerable uses in large establishments and in one-room tenements, occupied by different numbers of persons changing from day-to-day and some of whom have no alternative means of heating, lighting and cooking, whereas others have all three at their disposal'. Instead the Lord President's Committee agreed, on the Department's recommendation, to the adoption of a simpler expedient: the registration of paraffin retailers and their customers. This system had been employed since the outset

of the war to control deliveries of household coal,<sup>1</sup> and was now being increasingly employed to regulate the distribution of certain scarce foodstuffs not thought suitable for control by coupon rationing. This method of control thrust the work of ensuring that supplies were equitably distributed on those who were best placed to perform it: the retailers who were, or could readily become, well-acquainted with the circumstances of their regular customers. Retailer registration could be withdrawn at any time at the discretion of the Secretary for Petroleum. This offered a sanction which could be invoked against any tradesman who distributed paraffin unfairly. Meanwhile compulsory registration of customers would prevent anyone from getting more than his share by going around from shop to shop.

Paraffin is mainly burned in small domestic appliances. Fuel oil is burned in central heating plants and as a furnace fuel in industry. In the fuel oil market, however, there was not much scope for consumption cuts. Industrial users could not be deprived of what they needed nor could factories, schools and hospitals—which then accounted for about half the central heating market—be cut down in their supplies. Another consideration was the effect on public morale of making drastic cuts in supplies to office blocks, cinemas, theatres and churches. What the Government could, and did do, however, was to increase the supply of coal tar fuel oil and to bring pressure to bear on these consumers to use it in place of imported fuel oil.

Steps taken during 1940 to increase coal tar fuel supplies have already been described:<sup>2</sup> they included adoption of the fifty-fifty creosote-pitch mixture to bring up potential output from 250,000 to 500,000 tons a year. By the spring of 1941 the rate of tar oil consumption by former users of petroleum fuel oil had already reached nearly 300,000 tons a year. Nevertheless, by the end of 1940 the conversion programme had run into difficulties. Users could burn creosote with little or no modification of their plants; but to burn the more viscous creosote-pitch mixture meant extensive, and expensive, adaptation. Industrial users were reluctant to face the interruption to their production schedules; and they pointed out that it would involve them in expenditure averaging about £2 per ton of their annual fuel consumption. The Petroleum Board did its best to persuade its customers to make the change, and in November 1940 the Secretaries for Mines and Petroleum sent users a joint letter hinting at the possibility of compulsion. But the Government refused to subsidise

<sup>1</sup> Under the Fuel and Lighting Order, 1939 (S.R. & O. 1939 No. 1028) coal merchants had to register with the Mines Department's Local Fuel Overseers, and consumers to register with coal merchants. See W. H. B. Court, *Coal*, (H.M.S.O. 1951), Ch. VIII.

<sup>2</sup> See p. 172 *et seq.*

conversions, holding that consumers should be sufficiently compensated by the greater security of supply they would enjoy. The Government would go no further than allowing the cost of conversion as a reduction in assessing tax liability. It pointed out that coal tar products were cheaper than petroleum fuel oil so that users would save on running expenses. This reasoning had little effect.

Accordingly, on the advice of the Petroleum Board, it was decided to resort to compulsion. Legal powers were taken under a revised version of the Petroleum (No. 1) Order of 1940,<sup>1</sup> published on 15th April 1941, and coming into force ten days later. This revision gave the Secretary for Petroleum power to forbid the use of liquid fuels for burning, and thus, in effect, to prescribe what kind of fuel a consumer could use.<sup>2</sup> The choice of consumers compelled to burn creosote-pitch was made on the advice of the Petroleum Board, which was in the best position to know which of its customers could comply most conveniently. Users were given a right of appeal to an arbitrator appointed by the Secretary for Petroleum.<sup>3</sup>

Another field of consumption re-examined by the Petroleum Department in April 1941 was the use of vaporised gas oil as a constituent of town's gas. Before the war, a cut in oil supplies to the gas industry had been one of the few specific suggestions for black oil savings then put forward by the Department. The possibility of a 'considerable reduction' had been foreseen provided that gasworks could be relieved of a statutory obligation not to allow the calorific value of their gas to fall below a certain level; and the pre-war Falmouth Committee had recommended that this be done.

In fact the trend in war-time gas consumption had proved to be upward instead of downward. The redistribution of population and the rise in the industrial demand for gas meant that some gasworks had to maintain a much higher output than in peace-time. In these circumstances those which had standby water gas plant naturally used it on a full-time basis to supplement their 'make' of coal gas. Other gas undertakings, even if not pressed by higher demand, had to use their water gas plant because of air raid damage to their main carbonising plant. As a result, although the total 'make' of gas by 'statutory undertakings' was less in 1940 than in 1938—mainly because of air raid disorganisation—the output of carburetted water

<sup>1</sup> S.R. & O. 1940 No. 55.

<sup>2</sup> Petroleum Order, 1941 (S.R. & O. 1941 No. 546).

<sup>3</sup> Certain users were asked to make the change to tar oils because the vital nature of their work made it essential to guard against any interruption of their fuel supplies. These, if they could not meet the costs themselves, seem to have been given financial assistance, under the authority of the Ministry of Supply Act 1939 (2 and 3 Geo. 6 c.38) by the Department concerned with their operations.

gas<sup>1</sup> was nearly 9 per cent. greater.<sup>2</sup> By April 1941 the gas industry was using gas oil at a rate of about 150,000 tons a year, or 20,000 tons more than in 1938; the Gas Section of the Board of Trade warned that the rate of consumption was likely to go up.

The Petroleum Department and Shell-Mex House were at one in deploring this trend. The Department told the Lord President's Committee in April that gasworks ought to be able to reduce their consumption rate of gas oil by two-thirds to save 100,000 tons a year of oil imports. If necessary, it said, private consumers would have to have their gas supplies restricted. This was all very well but, as the Gas Section pointed out, the curtailment of private gas consumption presented 'almost insuperable technical difficulties'; how could one stop the consumer from turning on his gas tap and using all that he wanted?

This left only one alternative; the industry would have to make more of its gas from coal. But at this point the oil authorities came up against an unexpected obstacle; they discovered that Britain's principal native fuel was in even shorter supply than imported oil. Reluctantly the Petroleum Department came to the conclusion that oil supplies to the gas industry could not be cut. It could only suggest an appeal to gas undertakings to use their oil as sparingly as possible; in addition it resolved to make an appeal to the public for economy just before the cold weather began. The Lord President's Committee accepted this as the best that could be done.

(iv)

## Lubricating Oil and Bitumen

So far this chapter has been concerned only with fuel saving. But the economy programme also covered two petroleum products which were not fuels at all: lubricating oil and bitumen. The market for lubricating oil was in two main parts: there was the demand for lubricants for industrial machinery—a demand met mainly by the smaller lubricating oil firms; and there was the demand for engine 'motor oils' normally supplied under brand names by the big companies. Demand in these two sectors of the market did not keep in step after the outbreak of war. The demand for industrial

<sup>1</sup> It will be recalled that water gas, a mixture of carbon monoxide and hydrogen, is manufactured by passing steam over red hot coke; it is then mixed in a carburettor with vaporised gas oil to produce carburetted water gas.

<sup>2</sup> The total make of gas in 1940 was 297,690 million cubic feet as compared with 310,256 in 1938. The make of water gas was 29,774 million cubic feet in 1940 and 27,253 in 1938.



lubricants tended to rise because of the rise in industrial activity. The demand for motor oils, on the other hand, fell steadily with the decline in private motoring. The net effect was that total lubricating oil consumption averaged 59,000 tons a month during the first three months of the war but only 44,000 tons a month during the next nine. By the spring of 1941, however, motor oil consumption had started rising again, mainly because of the growing demands by the Armed Forces for engine lubricants. In presenting its economy programme to the Lord President's Committee the Petroleum Department took credit for a check in this rise as a by-product of the measures to reduce motor fuel consumption.

At the same time, independently of the 'programme', the Department took steps to encourage civilian lubricant consumers to 'reclaim' their own used lubricants. This was not done in the hope of making any significant savings. The Department fully accepted the discouraging conclusions arrived at by the Lubricating Oil Pool in its reports of August and December 1940;<sup>1</sup> its main reason for later taking action was the pressure of public opinion. In November 1940, and again in January 1941, the Secretary for Petroleum had faced questions in the House of Commons which implicitly criticised his supposed neglect of lubricating oil reclamation.<sup>2</sup> Following this episode the Petroleum Department sought to foster the development of private arrangements for reclamation, which the Lubricating Oil Pool had said were preferable to a national scheme. Lubricating oil users were canvassed by officers of the Petroleum Board and by the distributing firms. All large consumers were asked to reclaim their used lubricants. Smaller ones, who did not handle enough oil to justify installing recovery plant of their own, were asked to sell their waste oil either to 'reclaimers', or for use as fuel (which the Lubricating Oil Pool had suggested was the best way of disposing of waste lubricants). In the early spring of 1941 this campaign ran into difficulties because the Board of Trade was unwilling to grant steel licences for manufacture of recovery plants; later this obstacle was overcome by arranging that applications should be referred through the Petroleum Department for 'vetting' by the Lubricating Oil Pool. By February 1942 about seventy applications for steel licences for recovery plant had been recommended for approval; the estimated throughput capacity of the new plants was about 3,000 tons of used lubricants a year.

Reclaiming waste lubricating oil was a minor matter. Much greater promise of saving came from the efforts in April 1941 to reduce the consumption of bitumen. Bitumen was one of the

<sup>1</sup> See p. 100.

<sup>2</sup> H. of C. Deb., Vol. 367, Col. 226, 27th November 1940, and Vol. 368, Col. 33, 21st January 1941.

products used as a binder for road surfacing.<sup>1</sup> It also had industrial uses. Being waterproof, and largely impervious to changes in temperature, it is used for covering waterpipes and coating the felts used for proofing walls, flat roofs and basement floors. Since it has insulating properties bitumen is also used in electrical equipment. In 1938 approximately 175,000 tons of bitumen a year was being used in Britain for 'industrial' purposes and about 450,000 tons a year for road surfacing.

After the outbreak of war the 'industrial' market for bitumen expanded because of the construction of military huts and encampments and the growing demand for electric batteries, especially for Service radio sets and for torches, sales of which were stimulated by the blackout. But there was a big drop in its use for road surfacing: this was mainly because road construction and maintenance were severely cut at the outset of the war, but there was also a trend towards a greater use of tar. In the spring of 1940 the Pratt Committee<sup>2</sup> on high temperature carbonisation had recommended that tar for road surfacing should constitute the first call on the output of the tar distilleries. Over the calendar year 1940 only 193,000 tons of bitumen was used for road surfacing; industrial consumption was about 187,000 tons. But in 1941 the trend in bitumen consumption was upwards because of rising war-time demands, particularly for surfacing airfield runways.

But as part of the economy programme, the Lord President's Committee agreed in April 1941 that bitumen consumption should be cut by 50,000 tons a year. It asked the Ministry of War Transport to see that more tar was used for surfacing. Other 'user departments' were asked to look into the possibility of greater substitution in the 'industrial' field. For technical reasons it was not possible to dispense with bitumen entirely. But on 9th May a meeting of Departments decided that it should be possible to save, not 50,000 but 100,000 tons a year. The Air Ministry, for instance, could use concrete for surfacing runways. On the industrial side of the market, tar could replace the soft inner coating of bitumen used on roofing felt; tar could also be much more used for weather proofing outside pipes and cables, and in electric batteries. No new powers were taken to enforce this wider use of tar. However in May the Petroleum Board began refusing to supply bitumen unless the customer could produce a government certificate stating that it was needed for an essential purpose and that tar would not be an adequate substitute. Divisional

<sup>1</sup> Others were 'natural asphalt', a mixture of bitumen and other mineral matter found notably in Trinidad, and marketed in Britain by the Limmer and Trinidad Lake Asphalt Company; and 'refined' or 'road' tar. About 500,000 tons a year of tar was being used for road surfacing in Britain in 1938.

<sup>2</sup> Committee on High Temperature Carbonisation.

Road Engineers of the Ministry of War Transport were instructed not to give bitumen certificates for road surfacing when the use of tar was technically feasible.

(v)

### Home Refining

The level of bitumen consumption affected the level of oil imports mainly in an indirect way through the import of crude and partly-refined oil for final processing in this country. This is because the scale of home refining in Britain was largely governed by domestic demands for bitumen.

The pre-war Falmouth Committee had considered whether an expansion of home refining could help meet Britain's oil supply problem and had advised against such a policy: first, because of the supply problem in war-time; secondly, because of the assumed vulnerability of all oil plants in this country to air attack. Apart from this, there was the waste of tanker space brought about by the element of 'refinery loss'. Oil refineries normally use part of their feed-stock as fuel for their own operations, and in addition there is a loss in the refining process itself. In the late 'thirties it was usually reckoned that the output of a plant refining crude oil to a normal range of products was only about 85 per cent. by volume of its input. In other words 15 per cent. of each cargo of crude oil carried to this country would yield nothing to meet demand. It was precisely because of this, it will be recalled, that the British had been so critical of French home refining policy in the early weeks of the war.<sup>1</sup>

Nevertheless oil refining continued in Britain itself after war broke out, albeit on a somewhat reduced scale. So far as tanker requirements were concerned, the British refining programme was less wasteful than that of the French. At the outbreak of the war, France was meeting almost all domestic demands for petroleum from the output of her home refineries; whereas in Britain, in 1938, only slightly more than one-fifth of domestic oil consumption was met by home refinery output. The British, unlike the French, had never sought to encourage the growth of a home refining industry; indeed it is arguable that fiscal policies between the wars had a

positively discouraging effect.<sup>1</sup> In the absence of official inducements the international oil companies preferred to refine in the producing countries where labour costs were lower (though oil wages were high by local standards); by so doing they also reduced their shipping costs. Thus it happened that the only major oil company to find a reason to build more than one crude oil refinery in Britain was the partly Government-owned Anglo-Iranian Oil Company which, in the early 'twenties, opened plants at Grangemouth on the Forth and at Llandarcy, Swansea. In 1927 the Standard Oil Company (New Jersey) opened a crude oil refinery at Fawley, on Southampton Water; and in the 'thirties a British-owned 'independent', Lobitos Oilfields Ltd., built a small plant at Ellesmere Port, on Merseyside, to refine oil from its fields in Peru and Ecuador. Apart from these four plants all the refineries treating imported oil in Britain operated on 'topped' crude oil (that is crude from which the lighter fractions have already been distilled off).<sup>2</sup> At these black oil plants of course the element of refinery loss was less.

When in April 1941 the Oil Control Board, for the first time in the war, considered the question of home refining in Britain one thing seemed abundantly clear. There could be no conceivable justification for continuing to do what the French had been criticised for doing more than twelve months earlier—namely, to import crude oil for refining. A decision to stop, in any case, would involve closing only two United Kingdom plants. For, of the four crude oil refineries, Grangemouth had been shut down since March 1940, not to save tanker space but because of a ban imposed at that time on tanker movements up the east coast. Of the others Fawley, although awkwardly placed from the tanker point of view, could not be closed entirely because it was a convenient supplier of bitumen to south and south-west England.

The fact was that while it was expedient to stop imported crude oil refining in April 1941, it was imperative to continue manufacturing bitumen from imported oil to meet essential requirements that could not be eliminated by the bitumen economy programme. This involved keeping open, not only Fawley, but also three other plants which Shell had put up during the 'twenties at Shell Haven, on the Thames Estuary, at Stanlow on Merseyside, and at Ardrossan, on

<sup>1</sup> There was no discrimination in favour of oil products refined in this country, but on the other hand refiners would have to bear the higher cost of equipment and materials which followed from British tariff policy. A relatively meagre tax allowance for depreciation combined with a relatively high level of income tax, which discouraged all home investment at that time, fell with particular force on an industry in which technical obsolescence was unusually rapid.

<sup>2</sup> There was also a number of plants erected in this country before the First World War to distil white spirit and 'special boiling point spirits' from paraffin. In addition there was a plant at Thames Haven, owned by the storage company there (London and Thames Haven Oil Wharves Ltd.) and erected in 1907 to purify contaminated products.

<sup>1</sup> See pp. 122-123.

the west coast of Scotland, to produce a range of black products, but primarily bitumen, from imported 'topped' crude. By erecting plants to produce bitumen in this country the companies had been able to supply it to their customers in liquid form<sup>1</sup> less expensively than by shipping it heated; and also conveniently supply special grades adapted to special local needs, thus helping bitumen in its competition with tar for the fast-expanding market between the wars.<sup>2</sup> They could not change their supply method in 1941.

The Oil Control Board accepted the need to keep open the bitumen plants; but found it much harder to come to a decision on a third group of refining plants which had been built in Britain during the 'thirties following the development of the solvent refining process. The importance of solvent refining was that it made it possible, for the first time, to manufacture the most expensive oil product of all—high grade engine lubricating oil—from the heavy bituminous crude that had to be imported into Britain. Given the possibility, the commercial incentive to United Kingdom refiners to exploit it was obvious. Accordingly plants to make lubricating oil were installed at Llandarcy, Shell Haven and Ellesmere Port. A new 'independent' Manchester Oil Refinery Ltd., began to manufacture lubricants and other black products at Barton, Manchester in 1938. Finally, Shell erected its 'duosol' plant at Stanlow to meet Air Force needs.<sup>3</sup> This came into operation in July 1940.

What the Oil Control Board had to decide in April 1941 was whether to continue the manufacture of lubricating oil at plants which would otherwise have been closed down as non-bitumen producers; in other words at Barton and the two crude oil refineries at Llandarcy and Ellesmere Port (which, like Fawley, would have to operate on 'topped' crude for this purpose). Early in the month it set up a committee under the Permanent Under-Secretary for Petroleum to consider the question. On 11th April the committee answered with an emphatic 'no', reflecting in this the views of the major oil companies. But the Lord President's Committee, when it came to consider this one week later, was by no means so sure of the balance of advantage. The saving in imports would clearly be small, and against this had to be put the loss of a domestic source of expensive high quality lubricants, which were otherwise available only from dollar sources. Closure would hit the independent oil

companies particularly hard, because unlike the international oil companies, their plants in Britain were the only plants they had. The committee therefore decided to delay its decision and asked the Board of Trade to look into ways of helping the 'independents'.<sup>1</sup> What it had in mind was the possibility of using pitch instead of oil as a refinery fuel. Thus matters rested for the time being.

<sup>1</sup> Before about 1920 bitumen had been imported 'packed' into this country in solid or semi-solid form. This meant that the customers had to employ labour to break it up and plant to melt it down.

<sup>2</sup> Smaller bitumen plants were also erected at this time by 'independent' producers in the shadow of the big ones. W. Briggs and Sons Ltd. had a plant at Camperdown, near Dundee. Berry, Wiggins and Company Ltd., had plants at Weaste, on the Ship Canal; and at Kingsnorth, on the Thames Estuary.

<sup>3</sup> See p. 54.

<sup>1</sup> Manchester Oil Refinery Ltd. pressed its case actively behind the scenes.

## CHAPTER VIII

### HELP FROM OUTSIDE

(i)

#### Lend-Lease

**B**RITAIN's call for help in the spring of 1941 found the United States willing, and able, to respond. Since the middle of 1940 the mood of the American people had been changing. The mistrust which bred earlier Neutrality legislation, the suspicion and impatience which saw 'phoney war' as an apt description of the first nine months of hostilities, had given way to warmer feelings of sympathy. There was admiration for Britain's refusal to accept defeat and a growing awareness of the common interests linking the two countries. In a variety of ways the American people began to show their willingness to help. The United States government, for its part, had been restrained by the approaching Presidential election of November 1940. When this was out of the way the President declared himself without equivocation. In December 1940 he delivered his famous speech proclaiming the United States as 'the arsenal of democracy'. The United States, he made clear, would henceforth give all help to Britain short of actually fighting at her side.<sup>1</sup>

This meant first and foremost removal of the supply barrier embodied in the 'cash' clauses of the Neutrality Act. Outright repeal was still thought politically inexpedient. By the middle of January 1941, however, preparations to circumvent the Act were already well advanced. On 11th March, a Bill empowering the President to lend or lease 'defence articles' to countries whose defence he should think vital to that of the United States, received the assent of Congress.

A month before the passage of this 'Lend-Lease' Act<sup>2</sup> the British had been given to understand that petroleum would be included within its scope. Within a few days after the bill became law, more than \$150

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<sup>1</sup> 29th December 1940.

<sup>2</sup> The official title of the so-called 'Lend-Lease Act' was: 'An Act to promote the Defence of the United States, Public Law 11 of the 77th Congress, First Session'. It became law 11th March 1941. U.S. Statutes At Large, Vol. 55, 1941-42, p. 31. Published by the U.S. Government Printing Office, Washington, D.C.

million had been provisionally set aside for oil supplies. However there was much to be discussed and done before lend-lease oil could reach British hands. The Act had expressly stipulated that lend-lease supplies must be transferred directly to the government of the receiving country. This made changes necessary in the arrangements for transferring American oil to Britain. Hitherto this had been a purely internal affair for the oil companies concerned. After the introduction of lend-lease the oil was bought by the American government and transferred to the British government, which sold it at the normal price to the oil companies. Both governments had to set up machinery to handle these transactions. The United States Navy Department was appointed to do the purchasing on behalf of the United States government. The British government decided to appoint a special Petroleum Representative in Washington to make known their requirements and to receive the oil on their behalf. There was some delay in choosing a man, for the Americans were unwilling to accept anyone with affiliations in the oil industry. As a result it was not until 16th May that the appointed representative, Mr. (later Lord) Piercy, arrived in Washington to act as head of a British Petroleum Mission. It was not until 4th June that the first appropriation for oil was converted into a definite supply commitment; it was July before the first lend-lease oil shipment left America for Britain. Even then there were delays in procuring certain products. The traditional procedure of the Navy Department was to purchase by open tender. This caused some heartburning among those companies who saw their established share of the British market broken into. It also held up progress since it meant that exact specifications of the products required had to be procured from London and then rewritten in American terminology or matched to American equivalents.

Not only was the flow of lend-lease oil slow in getting under way: it was also limited in scope. At first only supplies to Allied Armed Forces and for civilian use in the United Kingdom were covered. The British deemed it wiser at the beginning not to press for the inclusion of civil supplies to other sterling area countries for fear of provoking an adverse decision which might be difficult to get changed later on. Consequently the cost of oil imported into these sterling countries by American suppliers continued to be paid for in dollars throughout the remainder of 1941. Fortunately, the American companies drew most of these supplies not from the western hemisphere but from the Dutch East Indies so that their dollar cost was relatively low. But the lubricating oil required by the rest of the Empire for civilian purposes could only be procured from the United States at a full dollar cost estimated at about \$23 million a year. However, by October 1941, the Americans had been persuaded

to agree that these lubricants should be furnished under lend-lease to the extent that they could be certified as required for purposes directly connected with the war effort—for example the production of munitions. Progress was then held up through differences of opinion over requisitioning procedures, and by the need to work out what supplies would actually be eligible. Eventually it was agreed that Australia, whose needs were considered first, should receive 60 per cent. of her lubricating oil imports under lend-lease. But it was the end of the year before the first Australian requisition was accepted.<sup>1</sup>

The British found the American Administration even more cautious when it was attempted to extend the scope of lend-lease to cover not only purchases from dollar suppliers but also the necessary dollar expenditure of sterling companies. The biggest element here, of course, was the dollars spent on oil company equipment and materials. Shell and the other sterling companies estimated that they would have to spend about \$36 million on steel and other raw materials and \$13 million on fabricated equipment during the twelve months beginning June 1941. As early as April of that year representatives of the Ministry of Supply in the United States had been endeavouring to get these steel requirements admitted under lend-lease. In May the Petroleum Department sent across another representative additional to the Piercy Mission, to take over these negotiations. The American lend-lease authorities were reluctant, however, to allocate lend-lease funds for the requirements of sterling oil companies. They feared that by doing so they would lay themselves open to a charge in Congress of using American public funds to bolster up foreign competitors of American companies. The British negotiators therefore changed their tactics; they decided to tackle the problem piecemeal beginning with the most favourable possible case. They indented for 8,000 tons of steel drum sheets required to make oil containers for the Middle East forces. This indent was accepted by the Americans late in May, although it was October before deliveries began. But the British were unable to build on this success. All applications for equipment and materials for non-military purposes to be supplied under lend-lease were invariably turned down; at the end of 1941 the prospects of getting them were still uncertain.

<sup>1</sup> The British wished to centralise all requisitioning through the British Petroleum Mission in Washington, on the grounds that shipping arrangements were made centrally from London. The Australians wished to requisition through their own representatives in Washington. The Americans at first wished, for convenience, to have all Empire requirements indented for through the British Petroleum Mission. But later the Americans swung round since they thought that separate indenting would enable them to keep track more easily of who had received their supplies. In the case of lubricating oils, which were nearly all shipped 'packed' to Australia, and therefore made no calls on tankers, the Australians appear to have had their way.

(ii)

## Tankers from the Western Hemisphere

The introduction of lend-lease, while it did not give the Allies unlimited access to United States oil resources, removed all risk of supplies being curtailed by shortage of finance. There still remained the task of ensuring that supplies were not curtailed by shortage of ships.

Before 1941 the Allied tanker fleets received little assistance or reinforcement from American tonnage. The Neutrality Act had prevented American-flag tankers from sailing to Allied ports; and the American government had discouraged proposals to circumvent this difficulty by temporary transfers of flag. In March 1940, when tanker space was short, the Ministry of Shipping had been authorised to spend up to \$2 million on buying American second-hand tankers. But the vessels offered for sale had nearly always been in bad condition; down to January 1941, the British had purchased only three of them.<sup>1</sup> No orders for new tankers were placed with American shipbuilders. New vessels would have been costly in dollars and, in any case, in the days before the fall of France, Britain's tanker-building resources seemed adequate to cover losses. After the disasters of 1940, this outlook changed. Tankers were sunk much faster than Britain could replace them and American building capacity offered the only long-term hope of making good these losses. The Lend-Lease Act offered Britain the key to that capacity, and she lost no time in using it.

Even before the end of 1940 the Admiralty had begun looking into the chances of buying new vessels in the United States; in January 1941 a British Merchant Shipbuilding Mission had been despatched to that country. The very day that the Lend-Lease Bill became law, the Joint Parliamentary Secretary to the Ministry of Shipping, Sir Arthur Salter, was sent to Washington to set up a British Merchant Shipping Mission.<sup>2</sup>

The Salter Mission was given the broad task of impressing on the American government the nature and urgency of British shipping requirements. In May the Salter Mission absorbed the Shipbuilding Mission already in Washington. Sir Arthur Salter urged the Americans to raise their shipbuilding programme to a level which would enable them to supply Britain with 4½ million deadweight tons of merchant ships a year. At first it had not been intended to include

<sup>1</sup> At a cost of £18 per deadweight ton.

<sup>2</sup> See C. B. A. Behrens, *op. cit.*, Ch. VIII.

tankers in this request. But after strong pressure from the Secretary for Petroleum it was agreed, on 25th March, that the Americans should be asked to build thirty tankers a year for this country. By the middle of April 1941 Sir Arthur Salter was able to report that an American shipbuilding programme was under way which, in addition to other vessels, would provide three-quarters of a million deadweight tons of new tankers during 1942.

This shipbuilding programme was a development of great significance; even if the high rate of tanker losses continued the long-term prospects now seemed secure. But it did not solve the immediate tanker shortage facing the British in April 1941. To deal with this Sir Arthur Salter asked for massive and immediate tanker assistance. He told the President's aide, Mr. Harry Hopkins, that Britain would need an extra seventy-five tankers as soon as possible to meet supply programmes over the rest of the year—even on the assumption (which then looked unlikely) that the British-controlled tanker fleet suffered no more net losses. He asked that the extra tankers be made available at a rate of about twenty a month.

There could be no question of meeting this request from the output of current American new building; a report at the end of May indicated that Britain could expect at best to get twenty-one new American-built tankers during 1941, most of them towards the end of the year. The answer, as the British saw it, lay in the repeal of the 'carry' clauses of the Neutrality Act which prevented American-flag ships from sailing to British ports. But the United States Administration did not think American public opinion was ready for this. As an alternative it decided to reinforce the tanker Shuttle service which the British had instituted earlier in the year to carry oil from the Caribbean and Gulf ports to the United States north-eastern seaboard (for onward lifting by British-controlled vessels).<sup>1</sup> This was a much less effective solution to Britain's problem: ten American tankers carrying oil direct to Britain would have been worth twenty working in the Shuttle. But it was help which could be given immediately: there would be no waiting while American tankers were armed and degaussed as would have been necessary for voyages across the Atlantic war zones. Indeed the tankers would not even have to leave their normal routes. All that would happen would be that vessels normally engaged in carrying oil from the Gulf coast and Caribbean to the north-eastern United States (for local consumption) would henceforward discharge their cargoes into specially rented storage where it would be held for shipment on to Britain.

No time was wasted in putting this measure into effect. The American oil companies were asked to release half a million deadweight

<sup>1</sup> See p. 162.

tons of tankers for service in the Shuttle; and in May 1941 the British Petroleum Board set up a Shuttle Department<sup>1</sup> in New York to rent storage and to organise the receipt and onward despatch of their cargoes. The first tanker in the American-organised Shuttle set sail on 21st May. By the middle of July 1941 there were forty-three United States-flag tankers—roughly 11 per cent. of the whole United States-flag commercial tanker fleet—involved in the Shuttle operation. Most discharged at New York, although transit storage was also rented at Baltimore and Philadelphia. The entire cost, including the hire of the storage—as well as the dollar cost of the original Shuttle operation which the British had organised for themselves in January—was born by the American government. Between May and July 1941 nearly 2½ million tons of oil for Britain was ‘shuttled’ up the United States north-eastern seaboard.

This indirect assistance was very welcome. But the British remained as anxious as ever to reinforce the tanker fleet actually plying directly to Britain. There was, it will be recalled,<sup>2</sup> a large number of American-chartered Norwegian tankers earning dollar currency in western hemisphere trades. The British had tried, and failed, to persuade the Norwegian government to secure their release for service in the war zones. Now the Americans exerted pressure. Early in May they let it be known that they considered all Allied-flag tankers not already working in the British supply programme should be placed on the Atlantic run. This cut the ground from under the feet of the Norwegians who had cited the importance of not offending the Americans as a reason for keeping these tankers where they were. By the end of May 1941 the Norwegian government had given formal assent to the principle that all Norwegian tankers should be employed on any duties which were required of them in the interests of the war effort; during June another 86,000 deadweight tons were chartered to the Ministry of War Transport.

In the meantime the American government had prepared to deal with the disorganisation likely to arise from the abrupt withdrawal of tankers from western hemisphere trades. The obvious solution was to pool all the remaining tanker tonnage available and allocate it strictly according to need. For this step the Administration needed wider powers and a suitable co-ordinating authority. On 27th May 1941 the President declared a state of ‘unlimited national emergency’. This enabled him to confer requisitioning powers on the

<sup>1</sup> In September 1943 this was renamed the Office of the Representative of the Petroleum Board (British). By then it was responsible for organising all movements of lend-lease oil to Britain and the rest of the Empire.

<sup>2</sup> See p. 179.

United States Maritime Commission,<sup>1</sup> the agency which, since February, had been responsible for controlling shipping movements. The next day he set up a new Office of Petroleum Co-ordinator<sup>2</sup> with the immediate task of sorting out petroleum supply priorities. Mr. Harold Ickes, Secretary for the Interior, was appointed to the new post and a few days later Mr. Ralph K. Davies, of the Standard Oil Company of California, was named Deputy Co-ordinator with ‘co-equal authority’ to act as executive head of the new Office. The final step came on 6th June 1941 when an Act of Congress gave the United States government power to requisition foreign ships in American ports. This enabled it to seize some 74,000 deadweight tons of refugee tankers (chiefly French and Danish): these were transferred to the American flag and used to replace vessels being released for war service.<sup>3</sup>

Meanwhile time was going by. At the end of May 1941 oil stocks in this country fell below the level that had been declared to be the absolute minimum for safety. But in June they began to recover. Not surprisingly, American voices were raised suggesting that Britain had exaggerated her need. As a counter move the British decided to give the American government the full picture of their oil supply position as the Oil Control Board saw it. On 28th June Sir Arthur Salter handed to Mr. Harry Hopkins a document which gave detailed account of Empire requirements and the tankers available, their whereabouts and how they were being used on 1st June. Sir Arthur Salter concluded that, even with the help of the Shuttle, an additional ninety-one tankers would be needed to restore stocks in Britain to a safe level before the winter. This was apart from any that would be needed to cover the difference between tanker losses and British new building.

Armed with these facts and figures the United States Petroleum Co-ordinator took further action. On the same day (28th June) he announced that he would take full responsibility for meeting all the oil supply needs of the western hemisphere. This cleared the way for the release of some eight Canadian and eight Norwegian vessels working in Canadian trade; it also permitted the withdrawal of five ‘free’ Norwegians which had been working on dollar hire for

<sup>1</sup> The United States Maritime Commission had been created in 1936 to build up the United States merchant fleet. Later, through a system of ship warrants, the Commission was able to control the movements of non-requisitioned vessels.

<sup>2</sup> As originally created this office was called the Office of Petroleum Co-ordinator for National Defence. After Pearl Harbour it was renamed the Office of Petroleum Co-ordinator for War, and on 2nd December 1942 it became the Petroleum Administration for War with strengthened authority.

<sup>3</sup> Seven tankers of 74,000 tons were requisitioned. The American side of the story is described in *History of the Petroleum Administration for War 1941-45*, prepared under the direction and editorship of John W. Frey and H. Chandler Ide (United States Government Printing Office, Washington 1946).

sterling oil companies in South American trades. This still left nineteen Norwegians working for American oil companies in the area. On 11th July the Petroleum Co-ordinator requested their American charterers to release these tankers, too, for British service. Finally, having cleared the way for Allied-flag tankers to go to the war zones, he called on the American companies to provide some twenty-six American-owned Panamanian-flag tankers for the United Kingdom import programme.<sup>1</sup>

Backed as they were by the United States Maritime Commission's power to requisition, these 'requests' were promptly met; by the end of July twenty Panamanians and another six Norwegians had been nominated for British service. The Norwegian tankers were taken on time-charter by the Ministry of War Transport and the Panamanians by the United States Maritime Commission. To meet the needs of the Norwegian government the hire of the Norwegian tankers continued to be paid largely or wholly in dollars. Under the so-called Tripartite Agreement it was provided that 80 per cent. of the hire of those tankers formerly working for British oil companies in South American trades should be paid by the United States authorities in dollars, the Ministry of War Transport meeting the remaining 20 per cent. in sterling. Under the Quadruple Agreement, which covered about 200,000 deadweight tons of tanker tonnage formerly on charter to American oil companies, the Americans paid the whole of the hire costs in dollars.

### (iii)

## The Empire's Contribution

The tankers which the United States government provided so readily in the summer of 1941 were made available at some inconvenience to the American public. The diversion of so many American vessels into the Shuttle as well as into other western hemisphere trades (to take the place of Norwegians and Panamanians made over to the British) led to petroleum shortages in the north-eastern states. To meet them the American government organised a big increase in rail movements overland, which meant a considerable rise in transport costs. The Administration also launched a 'voluntary conservation' campaign in the north-eastern states aimed at cutting down by a third the consumption of petrol for non-essential purposes. Coming at the height of the holiday season this 'phoney shortage', as it was

<sup>1</sup> In fact he requested thirty 'notional' tankers which was equivalent to the twenty-six of 300,000 deadweight tons actually provided.

called, was badly received by the American press and public.<sup>1</sup> In the autumn the Petroleum Co-ordinator and his deputy had to defend the campaign before a Senate investigating committee. Indeed their policy was not without its detractors even within the American Administration itself. The United States Maritime Commission was in favour of the restoration of United Kingdom stocks to a safe level; but the Commission questioned the need to build up stocks beyond that point which it described as entailing 'great and increasing cost' to the United States economy and industry.

These events in the United States had their effect on policies in other western hemisphere countries. Canada, as a belligerent country, found it more difficult to justify doing nothing to halt a rapidly rising home demand for petrol—for Canadians were consuming 20 per cent. more in mid-1941 than twelve months earlier. Because Canada was not in the sterling area and depended on tankers for only part of her oil needs, her government had made no attempt to restrict petrol consumption in the early months of the war; they contented themselves with a partial substitution (arranged by the Standard Oil Company (New Jersey)) of seaborne by overland supplies. British efforts to persuade the Canadians to reduce this demand were met by talk of the fiscal losses that would come from a fall in petrol sales and vehicle licences, and to the risk of damaging their tourist trade. Eventually in June 1941 it was announced that a pipeline would be constructed from the coast of Maine to the Montreal area, thus eliminating—for the greater part of Canada's seaborne imports—the long tanker haul round Nova Scotia and down the St. Lawrence. But something much more dramatic and immediate was called for at a time when the vigorous actions of the American Petroleum Co-ordinator had confronted all the western hemisphere countries with the threat of tanker shortage. Accordingly, in July 1941, the Canadian government launched its own 'voluntary conservation' campaign. The Canadian public was asked to reduce non-essential petrol consumption by a half; and petrol deliveries to retailers were cut by a quarter. At the same time a limit was placed on the hours during which petrol could be sold at filling stations.

American opinion and policies also had their effect outside the western hemisphere. In Britain herself the authorities took two decisions in June which reflected American thinking. On the vexed question of using tankers as grain carriers it was settled that transfers to grain traffic should only be made if it could be shown that grain imports were falling much further behind programme than oil imports. On the other major issue of home refining the long hesitation about whether or not to close the United Kingdom lubricating oil

<sup>1</sup> See John W. Frey and H. Chandler Ide, *op. cit.*



plants also came to an end. In May 1941 the Americans went on record as strongly disapproving any continuation of refining imported crude oils in Britain that could not be determined as absolutely necessary. Their view coincided with that of the British sub-committee which the Oil Control Board has set up originally to look into the question.<sup>1</sup> The Oil Control Board hesitated no longer. During June and July all the companies operating refineries in this country were notified that tanker space would only be allocated for imports of crude or 'topped' crude oil if it were needed for essential domestic supplies of bitumen.

During these months the British were in the middle of their economy drive. Other countries within the British supply programme also introduced restrictions at this time, though in their case only motor fuel supplies were affected. The scope for action varied from country to country. The Republic of Ireland, for instance, moved broadly in step with Britain herself. At the outbreak of war the Irish government had introduced a scheme to cut petrol consumption by 30 per cent.; this was relaxed in the middle of 1940 by agreement with London.

Most British dependencies also had petrol rationing schemes in operation by the middle of 1940; some, for example Nigeria and the Gambia, were making bigger savings proportionately than Britain.<sup>2</sup> But India, together with Ceylon, steadfastly resisted all pressure to ration. The Indian government argued that there was little pleasure motoring in India and that administrative and social conditions there would make it difficult to operate a rationing scheme. In fact, despite her size, India's petrol consumption was no larger than that of New Zealand and since her sources of supply were much nearer, the Indians made small demands on ocean-going tanker tonnage.

Among independent countries the three southern Dominions had varied responses to the idea of petrol rationing. South Africa made no attempt to curtail use of motor fuel: she urged the dependence of her widely scattered population on motor transport and the difficulty of enforcing a rationing scheme in rural areas where petrol distribution was often carried out by African labour. In view of the delicate political balance—the South African government had entered the war with only a very small Parliamentary majority behind it—London did not press the rationing point further.

New Zealand, by contrast, had gone further than Britain in the opening weeks of the war by imposing a complete ban on pleasure

<sup>1</sup> See p. 192.

<sup>2</sup> Some colonies were exempted because their petrol consumption was too small to make the introduction of a rationing scheme worth while; or because they were very close to supply sources; or because their imports all came in 'packed' form, and thus made no call on tanker space.

motoring. This was relaxed in December 1939 when the New Zealand summer holiday season began. In February 1940 the Government introduced a petrol rationing scheme designed to save 25 per cent. of pre-war consumption. In July this was tightened to increase savings to one-third. Rationing was not too well received by New Zealand motorists who felt, not without some justification, that they were being asked to do more than motorists in other Empire countries (even in Britain the basic ration was larger than in New Zealand after July 1940). A particularly sore point was the absence of any restriction in neighbouring Fiji, and above all, the much less stringent arrangements in Australia.

The Australians had made no move to ration petrol during the first nine months of the war, though constantly urged by Britain to reduce their oil imports. The Australian motor trade and other vested interests put up strong opposition and it was not easy for public opinion to understand the reasons for economising in supplies which came mostly from the relatively nearby Dutch East Indies. With a general election in the offing the Australian government went warily. In July 1940 it announced that a rationing scheme would be introduced; but this was only designed to cut pre-war consumption by a fifth, whereas London had been pressing for savings on the United Kingdom scale. Moreover when the scheme came into force in October 1940 it was administered so leniently that the cut amounted to no more than 8 per cent. Meanwhile, that November, the New Zealanders relaxed their own scheme once more.

Thus, in the early weeks of 1941, when further measures to restrict consumption came under scrutiny in Britain, only two independent Empire countries were rationing petrol, and in both the trend was towards relaxation. In February London appealed to all sterling countries, except South Africa, to cut down their import requirements and supported this appeal with a statement of the facts about the tanker and dollar shortages. But this approach met with little success. The Irish tightened up their arrangements once more but the southern Dominions were still in their summer holiday period when petrol restriction was always hardest to contemplate.

In the event, this lack of response proved more injurious to the other countries concerned than to Britain. Through its control of the oil tanker fleet, London had the whip hand in supply matters. Beginning in February 1941, the massive withdrawal of vessels from the eastern cross-trades to the United Kingdom's supply routes—amounting to some half a million deadweight tons between April and June alone<sup>1</sup>—brought about a rapid fall in stocks of countries bordering the Indian Ocean. Their governments were left with little

<sup>1</sup> See Table 9, p. 208.

choice but to enforce economies. Thus in April, when the Oil Control Board made another approach to Australia and New Zealand, the Australian government promptly announced cuts which would reduce petrol consumption to only two-thirds of the pre-war rate from 1st June; in July it turned the screw still further, aiming to reduce consumption to 40 per cent. of pre-war. This meant that the Australian basic ration would amount to only about half that allowed to British motorists. New Zealand moved in parallel. From May 1941 she reverted to the scale of the previous July, which had aimed to hold consumption to two-thirds of pre-war. In August she took steps to increase the saving by another 10 per cent. In the same month New Delhi also introduced a petrol rationing scheme aimed at saving 25 per cent. of the country's pre-war consumption. Ceylon followed suit three months later.<sup>1</sup> By the end of 1941 South Africa remained the only major Empire consumer which had taken no action to curtail the use of petrol.

(iv)

### Recovery

The decisions of the Empire governments on petrol rationing in the latter part of 1941 were taken against the background of a striking recovery in the United Kingdom's own oil position. Between June and December oil stocks in this country rose by nearly 2½ million tons, thanks to a remarkable upsurge in imports.

The picture shown by Table 8 contrasts sharply with that which had been painted by Sir Arthur Salter as late as the end of June in support of the request for direct American tanker help. The discrepancy was only partly due to that help. Sir Arthur Salter's portrayal of the original situation had been astray at two important points. First, the figures on which he relied had been based on forward consumption estimates by the Armed Forces which turned out to be a million tons too high. Secondly Sir Arthur Salter's assessment had assumed that tanker losses would continue at the level reached during the worst weeks of the spring. This was a prudent assumption,

<sup>1</sup> It may be of interest to compare the position in August 1941, of the 'non-essential' motorist in the countries where petrol rationing was in force. At this time motorists in the United Kingdom had a basic ration of petrol which allowed them to do roughly 2,000 miles a year. In India, the new rationing scheme allowed a basic ration of 2,600 miles a year. In New Zealand, after the cut in August, the equivalent figure was 1,300 miles a year. In Australia, from July it was 1,000 miles a year. Of course this does not give any idea of proportionate savings in the different countries since savings on commercial consumption and the size of allowances to business and 'essential' users are not taken into account.

but, most fortunately, it was wrong. A spectacular fall in shipping losses began in June. With the aid of new bases in Iceland it became possible, for the first time in the war, to give escort protection to convoys all the way across the Atlantic. At the same time air patrols over the Western Approaches forced the U-boats to break off their

TABLE 8

United Kingdom Oil Imports 1941\* (weekly average)

000 tons

	Total†	Caribbean	United States		Iran	Other
			Direct	Via Shuttle		
December 1940– May 1941	191·1	121·1	18·7	16·8	26·4	8·1
June 1941– November 1941	295·9	123·2	23·8	137·6	2·5	8·8

\* The figures are on a calendar basis and thus not strictly comparable with consumption figures in Table 12.

† Including surplus bunkers and packed imports.

blockade.<sup>1</sup> Between June and November 1941 total losses of British-controlled tonnage were little more than a third of the previous six months' figure. As a result, as Table 9 overleaf shows, the strength of the British-controlled tanker fleet ceased to decline after the middle of 1941, even without taking account of American reinforcements.

The effect on imports of this fall in tanker losses was reinforced by a considerable improvement in the performance of tankers sailing to and from this country. The main factors contributing to this were the ending of imports from the Persian Gulf; and the development in the western hemisphere of the Shuttle which increased oil liftings from New York. Tanker performance on individual routes improved as summer conditions reduced delays due to marine damage. Another helpful factor was the gradual fitting of permanent degaussing equipment in place of the temporary equipment that had caused so much trouble earlier in the year. Table 10 on page 209 shows the changes in the performance of the tanker fleet plying to Britain after the middle of 1941.

How much did American tanker help contribute to this British oil recovery in the second half of 1941? At the time there were good political reasons for giving the Americans most of the credit. But, as

<sup>1</sup> See S. W. Roskill, *op. cit.*, Vol. I, Ch. XXI.

TABLE 9  
Employment of Tankers in British Control and Service, April-December 1941\*

Date	Total Tonnage (1)	British Controlled Tonnage (2)	Free† Neutral Tonnage (3)	Carrying Petroleum		Carrying   other products (6)	Fleet Attendance (7)	Immobilised	
				United Kingdom§ (4)	Cross Trades (5)			Depot Tonnage (8)	Repairing, awaiting repair or otherwise not in use¶ (9)
April 15th 1941	7,480**	7,377	103	3,051	2,520	221	454	157	1,077
June 15th 1941	7,553	7,452	101	3,172	2,293	163	512	115	1,298
August 15th 1941	7,535	7,429	106	2,762	2,394	174	497	96	1,612
October 15th 1941	7,900	7,596	304	3,502	2,321	190	581	117	1,189
December 15th 1941	7,857	7,587	270	3,051	2,658	131	455	117	1,445

\* Tankers of 1 600 gross tons and over.

† Tankers on British register, Allied and neutral tankers on time-charter to the United Kingdom and other Allied tankers under the control of Allied governments. Includes Norwegian tankers made available under lend-lease.

‡ Neutral tankers (mainly Panamanian and American) not controlled by the United Kingdom but working in Allied trades. Excludes tankers in the American Shuttle.

§ Including tankers in United Kingdom coasting services.

|| Tankers carrying molasses, grain, palm oil, whale oil, water.

¶ Excluding tankers repairing for seven days or less.

\*\* Excluding 268,000 deadweight tons of 'controlled' tonnage and 88,000 deadweight tons of free neutral tonnage trading to South America within the British 'programme'.

Table 11 suggests, American assistance with tonnage did not come early enough nor on a big enough scale to account for the sharp upward movements in imports that came about in the month of

TABLE 10  
Tanker Round-Voyage Times 1941\*

	Eastern seaboard to United Kingdom west and east coasts	Caribbean/Gulf to United Kingdom west and east coasts	All voyages to United Kingdom west and east coasts
March-June 1941	66½ days	73 days	77 days†
July-December 1941	58½ days	67 days	61½ days

\* Excluding voyages of tankers carrying Admiralty oil fuel.

† Including from Persian Gulf.

June. Table 11 shows the months when the tankers provided by the Americans set sail in British service:

TABLE 11  
American Tanker Assistance 1941\*

	Norwegian-flag tonnage		Panamanian-flag tonnage†		Shuttle‡
	No.	000 d.w. tons	No.	000 d.w. tons	
May	—	—	—	—	23
June	—	—	—	—	55
July	—	—	—	—	82
August	4	52	3	35	69
September	8	104	17	196	82
October	8	105	3	35	64
November	6	86	—	—	51
December	2	24	—	—	12

\* Excludes American-owned or chartered tonnage in the eastern programme not provided through the efforts of the American government.

† Includes tankers transferred to the British flag but time-chartered to the United States Maritime Commission, and therefore remaining under American operational direction.

‡ There were also 22 Shuttle sailings between January and April 1941 arranged by the British.

As will be apparent from this table it was not June, but July, before the American reinforcements of the Shuttle began to affect the flow of supplies to this country. It was 21st August before the first of the Norwegians released to Britain through American intervention sailed for Britain from New York. It was another week before the first American-owned Panamanians sailed. The delay of two months arose from the fact that the vessels had first to be armed and de-gaussed, and some of them needed repairs. There was also difficulty

in crewing some of the Panamanians—in the end nine had to be manned by British crews, and were, in consequence, transferred to British registry.

American tanker assistance to build up this country's imports never reached the scale that was originally contemplated; and this was precisely because it was not needed. By late summer, when the tankers were ready, the position had improved so much that there was no need for all offers to be taken up; for instance, only two tankers in the end were removed from the Canadian trade. Some Panamanians and Norwegians were withdrawn after making only one voyage to Britain. Others never came to this country at all. In the autumn of 1941, as Table 9 showed, a considerable volume of tonnage was switched back into trades east of Suez where oil stocks had fallen so low that the Australian Prime Minister appealed personally to Britain's Prime Minister for extra tankers. Among the vessels sent east were some made available by the United States Petroleum Co-ordinator.

Simultaneously American tankers began to be withdrawn from the Shuttle. By the end of November the Shuttle fleet had been reduced to a few non-American-flag tankers which could not, for one reason or another, be used in British service in any other way. It should be noted that this withdrawal was also a direct reaction to the improved United Kingdom oil position. As a gesture to American public opinion the British had offered to release the vessels far back in September.

Between June and December 1941 over 3 million tons more oil was imported into Britain than would have arrived if the rate of imports had stayed at the level of the first months of the year. Allowing for losses, it seems unlikely that the American measures accounted for much over a third of this. The rest can be attributed to the improvement in conditions and the measures the British had themselves taken earlier in the year. Even without American assistance stocks in Britain would have been some 750,000 tons above 'minimum safety level' by the end of 1941.

The change in war conditions meant that American tanker help played only a secondary role in the late summer and autumn of 1941. Its importance, like that of American lend-lease during this period, lay less in what it gave than in what it promised. For the Americans the crisis of 1941—phoney or not—was a dress rehearsal for the part events forced upon them the following year. It gave the American authorities a head start in their preparations to meet war conditions—a consideration they were not unmindful of at the time. For the British, the American involvement transformed the supply outlook. This country survived heavy tanker losses between mid-1940 and mid-1941 because of the reserve of ex-neutral vessels that the German

assault on the Continental maritime nations had placed within her grasp. Now she had another reserve to fall back on—American tanker resources and, above all, the vast shipbuilding capacity of the United States. The American authorities shared this view. On the occasion of releasing American tankers from Shuttle duty, the United States Petroleum Co-ordinator wrote: 'If developments later require the return to you of the tank ships you are now delivering to us, or of additional ones, we shall be prepared promptly and without hesitation to supply them to you'.

This promise was all the more valuable because future help by American-flag tankers no longer needed to be wastefully confined to coastwise Shuttle movements. The Administration was already in the process of ending the 'neutrality' restrictions on the movements of American ships. From September 1941 the Neutrality Act was interpreted in a way which allowed American tankers to sail to Allied ports outside the war zone. In October five sailed for Iceland on behalf of the Admiralty, and two others for Singapore and Australia. In November the 'carry' clauses of the Act were repealed. Henceforth there was nothing—save the enemy—to prevent American-flag tankers from carrying oil to Britain herself.



CHAPTER IX  
AFTER THE CRISIS

(i)  
The Savings

THE recovery in the rate of oil imports during the second half of 1941 was accompanied by a decline in the demand for them, stemming largely from the measures of the previous spring to cut down oil requirements. It will be recalled that the authorities had hoped to make import savings at a rate of half a million tons a year (roughly 10,000 tons a week) by economies in consumption and by replacing imported petroleum by home-produced oils. Success exceeded expectations. For instance the programme to develop the use of creosote-pitch as a furnace fuel went ahead more rapidly than the April programme had allowed for. During the summer the Petroleum Department used its powers under the revised Order of April 1941 to compel a number of reluctant users to convert their plants to use this mixture. By September some 5,000 tons a week was being burned compared with 1,400 tons a week in May. As for the level of civilian oil consumption this fell by 12,000 tons a week; details are shown in Table 12 overleaf.

The decline in motor fuel consumption as a consequence of the cuts in supplementary issues to private motorists and other non-commercial users took place despite the fact that, as expected, many of the cuts to farmers and other priority consumers had to be restored in part or in full. Local authorities moreover incurred extra expenditure in a big general salvage drive which the Ministry of Supply launched at this juncture. The demand for petrol by civil defence services also fell away markedly in the second half of the year with the ending of the sustained enemy air raids. As for commercial transport it should be noted that the demand by public passenger vehicles actually went up, despite the cuts in long-distance coach services. This was because of an increase in the demand for bus and coach services to carry war workers to the new factories outside urban centres.<sup>1</sup>

<sup>1</sup> C. I. Savage, *op. cit.*, Ch. VIII.  
H\*



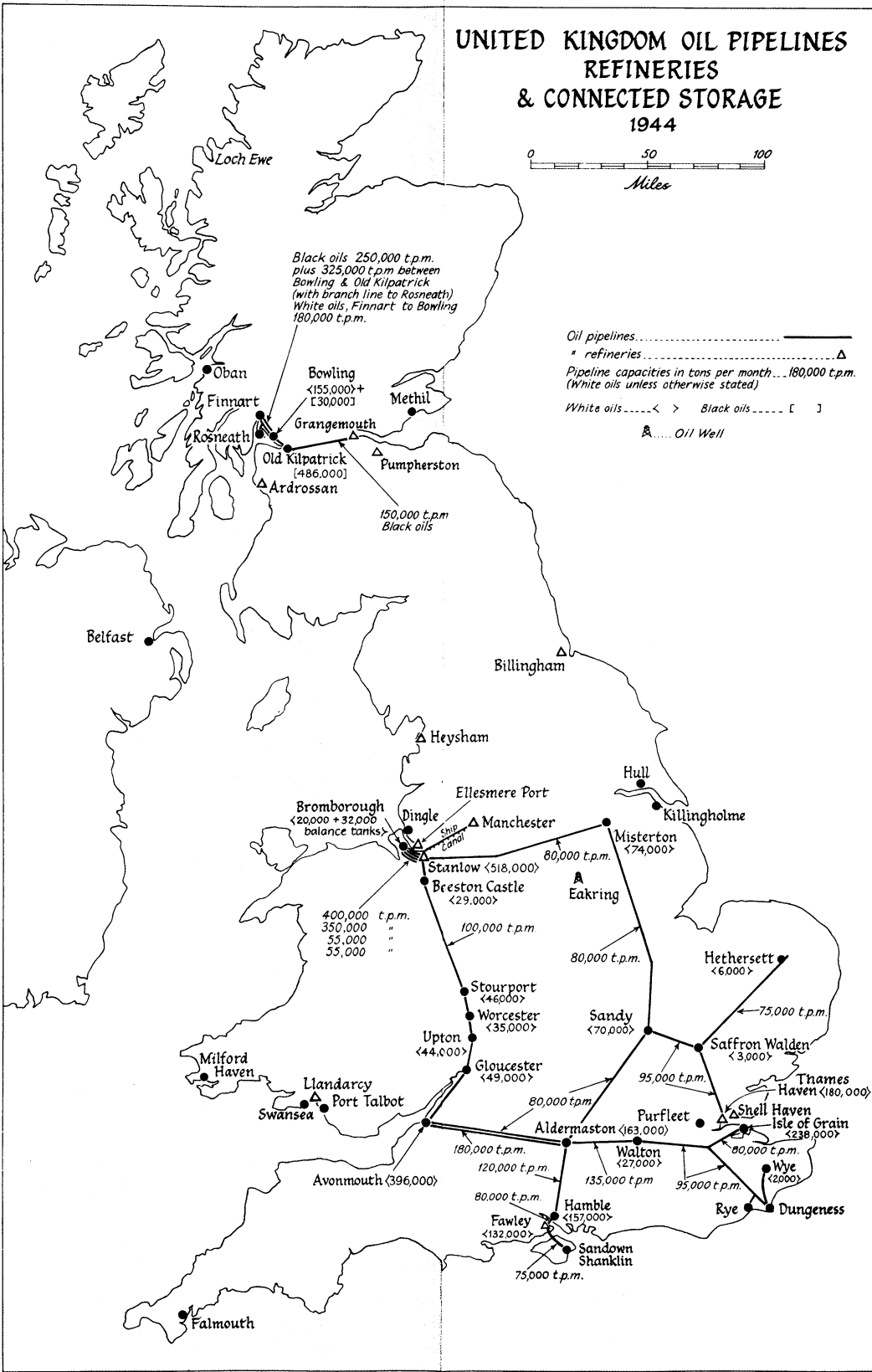
# UNITED KINGDOM OIL PIPELINES REFINERIES & CONNECTED STORAGE 1944



Oil pipelines.....  
 " refineries ..... Δ  
 Pipeline capacities in tons per month... 180,000 t.p.m.  
 (White oils unless otherwise stated)  
 White oils < > Black oils [ ]  
 Δ Oil Well

Black oils 250,000 t.p.m.  
 plus 325,000 t.p.m between  
 Bowling & Old Kilpatrick  
 (with branch line to Rosneath)  
 White oils, Finnart to Bowling  
 180,000 t.p.m.

150,000 t.p.m.  
 Black oils



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## AFTER THE CRISIS

(i)

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<sup>1</sup> C. I. Savage, *op. cit.*, Ch. VIII.



Turning to other products, there was a fall in the total consumption of paraffin, despite the seasonal rise in demand for engine paraffin by farmers. The halting of refinery operations also made a saving equivalent to about 15,000 tons of imports between May and September. However, as Table 12 shows, the biggest cut in civilian consumption did not come about as a result of the economy programme at all. It came as a by-product of yet another drastic change

TABLE 12  
*United Kingdom Oil Consumption 1941 (weekly average)*

		000 tons	
		January-June 1941	July-December 1941
All consumption	Total (all products)	240·3	228·1
	Armed Forces*	77·2	77·8
	Civilian†	163·1	150·3
Civilian consumption	Bunkers‡	20·9	15·1
	Motor fuel§	68·8	66·3
	Other	73·4	68·9
Civilian motor fuel consumption§	Private cars and motor cycles	16·1	14·5
	Lorries and vans	27·4	26·6
	Buses and coaches	10·2	10·6
	Other¶	15·1	14·6

\* Includes Admiralty oil fuel, aviation spirit, motor spirit and derv fuel consumed by the Forces, bunkers supplied by the Petroleum Board to minesweepers, and sundry Services factory consumption. Excludes paraffin and lubricating oil used by the Armed Forces.

† Including bitumen, refinery fuel, and also paraffin and lubricating oil used by the Armed Forces.

‡ Includes only deliveries to ocean-going vessels.

§ Petrol and derv fuel.

|| Consumption in Great Britain.

¶ Taxicabs, industrial and agricultural users, public authorities and police in Great Britain, together with all motor fuel consumption in Northern Ireland.

in oil bunkering policy. In the middle of May 1941 the shipping authorities decreed that all ships on the North Atlantic crossing should carry sufficient fuel to return to North America, or, in the case of motor vessels, to sail another 5,000 miles without bunkering in Britain; early in June this instruction was also extended to ships bound for the South Atlantic. This 1941 ruling went further than that of early 1940 in that ships were now directed to carry extra bunkers even at the expense of cargo. The ruling was issued not to ease the pressure on oil stocks (although of course it had that effect) but to ensure that vessels at United Kingdom ports should not find themselves trapped without fuel in the event of an invasion. The authorities were particularly concerned with vessels at east coast ports where oil stocks were low and ships were meeting increasing delays in refuelling.

(ii)

## Breathing Space

With imports high and stocks rising fast—and the assurance of American tanker support at need—it would have been surprising if the pressure for economy on the home front had continued undiminished right down to the end of 1941. In fact, although there was no formal change in policy, the economy drive was relaxed in a number of ways that autumn. In October Shell-Mex House was authorised to release extra supplies of domestic paraffin to dealers to enable them to build up their stocks against emergency; a cut of 25 per cent. in supplies of oil for central heating plants, introduced in 1940, was abandoned. Late in 1941 the programme to convert fuel oil burning plants to creosote-pitch came to a halt because of doubts about the supply of creosote. The June decision<sup>1</sup> to save imports by closing down United Kingdom lubricating plants that worked on imported oil was rescinded, with the agreement of the Americans; there was doubt whether American plants would be able to manufacture all the high-grade engine lubricants likely to be needed in 1942. The tight restrictions on commercial bunkering in Britain were relaxed. Finally, there was a striking change of policy towards the gas industry. Gas undertakings, faced with an increasing demand for gas and a growing difficulty in obtaining coal of the kind they required in the quantities they needed, began to use more oil. In August 1941 they were instructed to meet extra loads with gas made from oil in preference to carbonising more coal. The Petroleum Department, which had not been consulted, protested in vain at this decision: plans for the winter of 1941-42 were drawn up on the basis that gas undertakings would continue to economise in coal by using as much oil as they could in its place.

There was one notable exception to this general trend of relaxation, however. The later months of 1941 saw further restrictions laid on motor fuel users. Of these the most significant was a reduction in the basic petrol ration. In admitting the administrative obstacles to this step in April<sup>2</sup> the Lord President's Committee had made it clear that the 'basic' was only getting a temporary reprieve. For the committee had, at the same time, instructed the Petroleum Department to start recruiting the additional staff it needed to overcome those administrative difficulties. In May the committee had followed this up by initiating an enquiry into the effect that reducing the private 'basic' would have on the demand for public transport.

<sup>1</sup> See p. 204.

<sup>2</sup> See p. 183.

The answer was encouraging. The Ministry of War Transport reported that the transport services could handle any new demand created without difficulty, since most of it would probably come in off-peak hours. Conveying this information to the committee on 9th June the Secretary for Petroleum himself went on to recommend a cut of one-sixth in the 'basic' on psychological grounds; this would, he said, 'be helpful in effecting economies in other directions'. Coming from the source it did, this recommendation settled the matter. The Lord President's Committee directed that the cut should be introduced in August at the start of the next rationing period. The Prime Minister disliked the idea of introducing the cut during the holiday season, however: it eventually came into effect for motor cars (but not for motor cycles) on 1st November 1941.<sup>1</sup>

November 1941 also saw the closing of a loophole whose effects had been blunting some of the psychological impact made by the cuts in April that year. Those cuts had been followed by a noticeable increase in the use of hire cars to attend race meetings and other outings. Hire cars, like taxicabs, could be used for any journey the hirer chose to make. But since, from the hire car owner's point of view, all such journeys were a 'business' use, hire cars were rationed on the 'semi-essential' scale; and indeed, since October 1939, on a more generous one. This could no longer be continued. Hire car allowances were cut in the summer of 1941 in step with allowances for other 'semi-essential' consumers. But it soon became clear that only an express legal prohibition would end an abuse which was provoking increasing public criticism and ill-will. This was provided in November 1941 by an Order limiting journeys by hire car to a twenty mile radius in the London area, and fifteen miles elsewhere: if it could be shown that the journey was in the national interest or for urgent professional or domestic purposes, the radius was extended to 150 miles.<sup>2</sup> Race-goers thereupon took to using taxicabs. To stop this

<sup>1</sup> On 14th June 1941 the Prime Minister minuted the Lord President. 'We have to think of Bank Holiday and of the fact that many people may be getting leave this August for the first time since the war. . . . Could you not arrange to begin the experiment in October?'

<sup>2</sup> Motor Fuel (Hire Service) Order, 1941 (S.R. & O. 1941 No. 1745). From 1st September 1942 the radius for the whole country was reduced to ten miles from the car owner's garage; and the limit on journeys for necessary purposes came down to seventy-five miles (though Regional Petroleum Officers had discretion to issue licences for longer journeys). (Motor Fuel (Hire Service) Order, 1942 (S.R. & O. 1942 No. 1469) and Motor Fuel (Hire Service) Order, 1942, General Directions (Declarations) No. 1 (S.R. & O. 1942 No. 1516)). The basis of the allowance for 'hire cars' was also changed from a scale graduated according to horsepower to a flat rate of 35 gallons a month for 'chauffeur-drive' cars, and 10 gallons a month for 'self-drive' cars. Regional Petroleum Officers also had discretion to increase this last on submission of mileage returns by the operators. These allowances were raised to 65 gallons and 15 gallons respectively in 1944. Meanwhile in June 1943 a new Control of Motor Fuel Order, 1943 (S.R. & O. 1943 No. 780) confined the use of self-driven hire cars to two 'permitted purposes', and prohibited anyone from hiring a vehicle for more than three consecutive days, or for more than six days in any one month.

practice an Order of August 1942 forbade taxicabs, with certain exceptions, from operating more than five miles outside the area in which they were licensed to ply for hire.<sup>1</sup>

Meanwhile the decision to cut the private basic ration had stimulated the Ministry of War Transport to increase its July cut in the basic ration for road haulage vehicles from one-sixth to one-third. This took effect in October 1941. In September the Ministry also abolished the so-called 'basic' allowance for bus and coach operators. For reasons already explained this was more a change of form than of substance, however.<sup>2</sup> In making these cuts in the commercial 'basic' the Ministry was not primarily aiming to make savings; nor did it believe that savings would be a necessary consequence of them.<sup>3</sup> It was the size of the transport task that was the controlling factor in the level of commercial consumption; and if this remained the same, or increased, losses in 'basic' would simply have to be made good by extra discretionary issues. What the cuts did do was to bring road transport under tighter control by enlarging the 'discretionary' element in hauliers' supplies. 'The wider object', as the Minister, Lord Leathers, explained, was to make the 'most economical use of our transport system by rail no less than by road'. The Ministry used this greater power to withhold supplies for promoting the pooling of retail deliveries.

As well as reducing motor fuel allowances, the authorities also strengthened the machinery to prevent supplies or coupons from being diverted to illicit uses. In the later months of 1941 the known existence of a small but demoralising black market in petrol coupons was causing serious concern to the Petroleum Department and the Ministry of War Transport. They feared that successful flouting of the regulations might prove contagious, and undermine the moral basis of the rationing scheme.

The Department employed two methods to combat this form of cheating: publicity to bring home to the public the importance of not wasting petrol; and deterrence—that is, the detection and prosecution of offenders. The publicity effort was particularly vigorous in 1941. The Lord President's Committee had instructed the Secretary for Petroleum to prepare a campaign to reinforce the psychological effect of the cuts in allowances introduced in April. Since it was impossible to give the true background to the cuts the need for economy was attributed to the growing requirements of the Armed Forces in the Middle East. Mr. Lloyd himself made a widely publicised speech which was supported by B.B.C. announcements

<sup>1</sup> Motor Fuel (Cab Service) Order, 1942 (S.R. & O. 1942 No. 1468).

<sup>2</sup> See p. 170.

<sup>3</sup> Except by reducing the opportunities for vans and lorries to be used on pleasure outings, which was still legally permissible.

and inspired articles in the press. As for deterrence the Petroleum Department had early decided that it could not rely solely on the police. In the spring of 1940, when complaints about excessive private motoring were first loudly heard, the Petroleum Department appointed twenty-four inspectors of its own, mostly ex-police officers, and distributed them through the Regions. These Inspectors had power, under the Defence Regulations, to enter and inspect premises at which any fuel was being stored, produced or consumed and to require the production of records and samples on a warrant from the Petroleum Department; they also had powers to seize petrol coupons. In September 1941 it was decided to double the number of Inspectors; later a police superintendent was seconded from Scotland Yard to supervise them. A practising solicitor with experience in prosecuting breaches of the petroleum regulations joined the staff of the Department's Rationing Division to give guidance to the Inspectors.

The effects of publicity and police work were reinforced by administrative measures against the two main classes of abuse. One was the misuse by motorists of their supplementary coupons. At the instance of the Lord President's Committee an attempt was made to check this by requiring motorists to keep a log of all their journeys, whether made on supplementary or basic rations. They were told that they might have to produce the log for inspection when applying for their supplementary coupons at the beginning of each rationing period. For a time the Government considered making the keeping of a log book compulsory. The Lord President himself thought this necessary because the sanction against those who did not comply—the withholding of the allowances—might penalise essential users for not conforming to what was, after all, no more than a request. In a new Motor Fuel Rationing Order issued in October 1941 the Secretary for Petroleum took power to issue a compulsory order. But in fact he never made use of it.<sup>1</sup> The Prime Minister expressed himself forcibly against 'multiplying the filling up of forms and providing a new foundation on which layers of officials may build their homes'; and opinion in the Petroleum Department itself inclined against it. The logging system was introduced nevertheless; from the autumn of 1941 a selection of motorists' logs were called for and inspected at the beginning of each rationing period. Many who did not produce them had their supplementary allowances halved; and rather than submit logs they accepted these cuts without protest.<sup>2</sup> The log book proved a useful deterrent; for although it might be easily faked, the

<sup>1</sup> Motor Fuel Rationing (No. 3) Order 1941 (S.R. & O. 1941 No. 1592).

<sup>2</sup> 28,711 applicants for supplementaries were given only half their normal allowances and told that applications for more would only be considered on receipt of their logs; of these, 13,655 simply accepted the cut and 1,612 submitted unsatisfactory logs. During the same period 5,838 applicants who had already accepted half rations without protest, received a further cut of 10 per cent.; 5,035 accepted these cuts also rather than produce a log.

majority of motorists seem to have shrunk from a breach of regulations which left no room for self-deception.

The second and more serious abuse was the illicit transfer of 'X' (goods vehicle) coupons or supplies from commercial petrol stocks into the hands of private motorists. This problem was discussed at a Joint Conference on Motor Fuel Rationing and Economies which began meeting in August 1941, under the Parliamentary Secretary to the Minister of War Transport, to study how to check abuses and to recommend economies. The Joint Conference provided a useful point of contact between the rationing officials of the Ministry and the Petroleum Department, and also with Shell-Mex House, whose representatives often attended; its meetings continued into 1942. One of the weaknesses brought to light was the fact that records were not kept of the serial numbers of 'X' coupons, so that they could not be traced back to the recipient in the same way as private supplementary coupons. This made illicit transfers almost impossible to track down.<sup>1</sup> Keeping these records would have meant much extra work for the unpaid Group organisers who distributed the 'X' coupons, and the Ministry of War Transport was loath to place this burden upon them. But in the end the Joint Conference came to the conclusion that the Group organisers would have to undertake it.

The Conference also sought to put a stop to an even more prevalent abuse, believed to be responsible for the greater part of the leakage of supplies to unauthorised users; namely, the delivery of petrol to private motorists from bulk commercial stocks. The Conference suggested that commercial petrol should be dyed a distinctive colour. This expedient was successfully adopted after the war; but in 1941 it was rejected because all available dyes were in use to differentiate the grades of motor spirit and aviation spirit used by the Armed Forces. The authorities therefore decided to rely on more frequent checking of commercial users' storage by the enlarged corps of Inspectors. They also sought to check illicit deliveries of commercial petrol by examining the vehicle records submitted by commercial bulk consumers when they applied for supplementary rations. But this rarely gave enough evidence for a prosecution. An obvious loophole arose from the practice of depositing or 'banking' petrol coupons with suppliers in advance. This practice had been encouraged by the fact that coupons were issued in higher denominations than many consumers could conveniently use. It gave an opportunity for illicit transactions by enabling delivery to be taken after the expiry date of the coupons; for if the depositor failed to claim his supplies they could be sold to someone else. To remove this

<sup>1</sup> Indeed, down to 1941 there was, through an oversight, not even an express legal prohibition against supplying a private car with fuel on an 'X' coupon. The recipient would be in breach of the regulations, however.

temptation coupons of large denominations were henceforth issued only to the owners of bulk storage.

In tightening up their motor fuel rationing arrangements in the later months of 1941 the authorities were making use of the breathing space afforded them to prepare for sterner times that might lie ahead. In the same spirit of preparation they sought to improve the capacity of the west coast ports of Britain to handle oil supplies and tankers by constructing new facilities. Most of this work was also carried out in the second half of 1941.

(iii)

### Ports and Pipelines

It will be convenient to begin with the examination of port facilities along the west coast that took place in August 1941. This exercise, the second of its kind in less than twelve months, was undertaken mainly to allay disquiet in the United States. There, resentment at the consequences of the Petroleum Co-ordinator's measures to help Britain had led to allegations of tanker mishandling against the British authorities. Even within governmental circles there were Americans who had doubts on this score. Outside them speculation ran wild; thus, on 8th September 1941 the *Chicago Tribune* ran a story that Britain had 500 unused tankers. If only to defend itself from attack the United States Administration had to establish the truth beyond all doubt.

Accordingly Mr. B. B. Howard, representing the Maritime Commission, and Commander W. M. Callaghan (United States Navy), were sent to Britain in August 1941 to find out how tankers were being handled here. They suggested a number of improvements and, in September, after their departure, a 'Special Naval Observer' was appointed to the staff of the American Embassy in London. His function was to keep an eye on the handling of tankers on this side of the Atlantic and report to the United States Maritime Commission on the extent to which Mr. Howard's and Commander Callaghan's suggestions were put into effect. He remained until the middle of 1942, attending (as an observer) all the meetings of the Tanker Advisory Committee.

The Howard-Callaghan Mission spent part of its time examining the movements of tankers in Britain's coastal waters. This was not surprising. In the summer of 1941 tankers coming to Britain were spending on average a quarter of their total round-voyage time in these waters; more than half of this time was taken up with sailing

in and waiting for coastal convoys. However the visiting Americans did not find Britain to blame for this. They accepted that most delays, when they occurred, arose from unavoidable operational causes—such as the need to sweep the routes clear of mines.

They looked far less kindly however on the extent to which tankers were being directed on the long voyage round to east and south coast ports in the summer of 1941. As the accompanying table shows,

TABLE 13  
Oil Imports into the United Kingdom by Groups of Ports\* (weekly average)  
June-September 1941

	Total	West Coast†	East and South Coasts
June 1941	208·0	150·8	57·2
July	222·4	151·7	70·7
August	242·7	161·8	80·9
September	290·9	186·8	104·1

\* Excluding Admiralty oil fuel.

† Excluding Belfast.

the capacity of the west coast oil ports had increased remarkably since the autumn of 1940; between June and December 1941 those ports handled an average of 165,000 tons a week (nearly 2½ times as much as before the war), compared with 106,000 tons over the last four months of 1940. But the level of cargo arrivals was so high that many tankers had to be received in the east and south. Imports through the east and south coast ports rose to an average of 104,000 tons a week during September; this was nearly twice the weekly average through those ports three months earlier.

The United States Maritime Commission disliked this policy of the British authorities. It was not convinced of the wisdom of filling up tankage along the east and south coast ports at the cost of such a lengthening of ocean-tanker voyages. As an alternative the visiting Americans even suggested the building of a fleet of concrete barges to carry oil from west coast to east. Meanwhile they pressed hard for a reduction in the number of east coast discharges even at the sacrifice of imports.

But the main concern of the Americans was with the improvement of facilities at the west coast ports. During August the American mission visited all the main oil importing centres along the west coast. They found much that they thought could be done to speed up tanker-handling there, but less that it was practicable to do. For instance, restrictive local safety regulations were still causing delays, despite all the efforts that had been made to get them removed. The Americans

suggested that the Ministry of War Transport promulgate a new set of general regulations applicable to all the oil ports in the country. The British explained that differences in local conditions meant that these would have to be drafted in terms too wide to have much effect. One restriction picked out by the Americans—the refusal of the Avonmouth port authorities to allow tankers to dock during darkness—was, in fact, removed in the autumn of 1941. In general, however, relaxations of this kind made less difference than might have been expected. It was one thing to alter the regulations; and quite another to persuade pilots and ship masters to navigate their inflammable cargoes through narrow and congested approaches after night had fallen. It was still rare, at the end of 1941, for vessels to approach their berths at any of the west coast oil ports after dark.

The Americans attached great importance to removing another cause of delay—the declining morale of ships' companies. Masters have the last word in the movement of their ships, and on tankers, unlike dry-cargo ships, unloading operations are performed by the crew, instead of by shore labour. But the strain on both masters and crews was heavy. After the rigours of the Atlantic crossing, crews wished to make the most of precious days in port, and shore leave was often granted on a scale which left the ship with too few hands to carry through the unloading efficiently. Furthermore neither crews nor captains were always fully ready to face again, within a short space of time, the hardships and dangers of the sea. There was a growing tendency to draw out the unloading and to linger in getting away from the berth; masters found all kinds of ostensibly legitimate reasons for missing their outgoing convoy. The Americans suggested better shore leave arrangements. They also made two specific proposals: that tankers in port should be manned by skeleton relief crews so that the ship's company could get away on shore; and that masters should be given a financial inducement to get their vessels away quickly. Both proposals were investigated by the British; and both were rejected as impracticable.

One suggestion the British did accept, however, went some way towards solving this problem: this was to unify and tighten administrative control over ships and shore facilities at the ports. The oil company men responsible for speeding up tanker turn-round were finding it difficult to exercise authority over masters employed by other oil companies, and over masters of chartered vessels; this was particularly true when foreign tankers were concerned. The Americans proposed that the Ministry of War Transport should appoint their own resident representatives to each main port with enough powers and authority to take a strong line with tanker captains. This suggestion was adopted at an inter-departmental conference held at the Ministry of War Transport on 16th September. The

first two of the new Tanker Co-ordinators, as they were called, took up their duties on the Clyde and the Mersey in the autumn of 1941. A third was appointed to Avonmouth early in 1942. The official title of these officers was Deputy Shipping Representatives (Tankers) and they were given the same powers over ships in port as were possessed by the Shipping Representatives whom the Ministry of Transport had appointed in the autumn and winter of 1940 to sort out the confusion at the dry-cargo ports.<sup>1</sup> They were also given authority over the management of oil installations ashore and replaced the Port Petroleum Officers on the Port Emergency Committees.<sup>2</sup> Their duties were to speed up turn-round and to make recommendations for improving the operation of tankers in port. Selected by Shell-Mex House, they held their appointments jointly from the Petroleum Board and the Ministry of War Transport.

In addition to problems of organisation, the Howard-Callaghan Mission also looked into the scope for increasing physical reception facilities for tankers along the west coast. They found projects of development already under way. For instance, only the previous month the Oil Control Board had authorised the building of new tanker berths on the Clyde. Since diversions of shipping in 1940 the Clyde had become a major centre for the reception of black oils. Traffic had been encouraged by the existence of a large pipeline—its capacity was 150,000 tons of fuel a month—which the Admiralty, repeating an expedient of the First World War, had laid from its own storage installation at Old Kilpatrick across the thirty-six mile waist of Scotland to Grangemouth on the Forth.<sup>3</sup> This pipeline was not employed to full capacity by the Navy and it was an obvious step, especially after the diversion of shipping, to use it for the transfer of civil black oils as well. Unfortunately tanker-handling facilities on the Clyde were not sufficient to permit this pipeline's spare capacity to be used to the full extent. There were only two ocean tanker berths, one owned by the Admiralty at Old Kilpatrick and another three miles down river at Bowling; both were on the open river where tidal conditions caused berthing delays. The Admiralty suggested that its own berth at Old Kilpatrick should be lengthened to allow it to take two tankers at once. But, after an engineering survey, it was decided to build two new berths at Bowling, and to connect them with Old Kilpatrick by a pipeline.

The visiting Americans, when they came to look at the Clyde, were struck by the ease with which the narrow and twisting eight-mile long approach to Bowling could be blocked by enemy mines or bombs. They urged that an alternative point of discharge should

<sup>1</sup> See C. B. A. Behrens, *op. cit.*, Ch. VI.

<sup>2</sup> See p. 79.

<sup>3</sup> See Map facing p. 213.

be provided. Their suggestion was to lay moorings for two tankers at Finnart on Loch Long, twenty-five miles distant, and to connect these by pipeline to the discharge point at Bowling. The Oil Control Board approved this in principle in October 1941. In view of the shortage of labour and materials—difficulties in obtaining labour had delayed the start on the new Bowling berths—the Americans recommended that the project could be carried out as a lend-lease task. The British welcomed this and, as an extra inducement, suggested in November that the pipeline should be linked to the Gareloch where a destroyer base was being built at Rosneath. The British also suggested that a second pipeline to carry white oils should be laid alongside the first from Finnart to Bowling. In this final form the scheme was acceptable to the Americans: work on it began in May 1942.

Much more important than the Clyde as an oil importing centre was the Mersey. Here there were five ocean tanker berths connected to the huge Stanlow storage installations—which included two tanker lay-byes on the Manchester Ship Canal that had been brought into use in 1940. The approach to Stanlow was through the Canal which was congested and difficult to navigate, and could only be traversed in daylight, thus causing a big loss of tanker time. In September 1941 the situation was carefully considered by the Storage and Development Sub-Committee of the Oil Control Board. At Bromborough, eight miles down river, there was a dock capable of taking one ocean tanker and a coaster. Here the Air Ministry had sited one of its new Reserve Depots and was now proposing to connect this by pipeline with its storage in and around Stanlow. The Storage and Development Sub-Committee thought that this scheme should be extended in a way to make Bromborough a main centre for the reception of ocean tankers. It recommended that the coaster berth should be lengthened to enable it to take ocean tankers; that new storage of 12,000 tons capacity should be installed and connected to the berths to act as transit tankage; and that, not one, but two pipelines should be laid to Stanlow. This meant that there would be two more berths connected to the Stanlow storage. Moreover these would be berths where tankers would have a much quicker turn-round; on average tankers could save twelve hours by discharging at Bromborough instead of at Stanlow docks. An even more important advantage was that oil imports into the Mersey area would no longer be solely dependent on the vulnerable approach through the Ship Canal. Oil Control Board approval for this scheme was obtained in October 1941.

The biggest incentive to improvement was at Avonmouth, soon to be the main oil supply port for the London area. It will be recalled that diversion of shipping had led to oil supplies being delivered by

rail from the west coast to London.<sup>1</sup> However, despite the rise in west coast importing capacity during early 1941, it never proved possible to meet all London's needs in this way; indeed on occasion Shell-Mex House had had to divert a quarter of Avonmouth's white oil traffic to South Wales despite complaints by the railway authorities. The reason was that at neither Avonmouth nor Stanlow was port capacity adequate to handle these London supplies in addition to handling those required nearer at hand. Beginning in November 1940 black oils for London and other east coast ports were shipped south from Grangemouth, after transfer through the Clyde-Forth pipeline, in small tankers and elderly vessels unfit for ocean voyages; and roughly 70,000 tons a month of petrol and paraffin was carried to the London area by ocean tankers sailing northabout to discharge at the Thames, despite the hazards and delays they incurred.

One of the first acts of the Storage and Development Sub-Committee had been to look for a way of putting an end to this coastwise movement. In the spring of 1941 the sub-committee considered a number of proposals for laying white oil pipelines across the country from the west coast. It turned down plans for a white oil pipeline from the Clyde to the Forth and for a line from the Mersey to the Humber. But it immediately endorsed a scheme to lay a pipeline from Avonmouth direct to the London area. The Oil Control Board gave its approval in April and work began in June 1941.

When the American port mission visited Avonmouth in August this pipeline scheme was already well under way. There was, however, considerable urgency to expand the handling capacity of the port itself. At that time Avonmouth had three tanker berths in operation and another under reconstruction and likely to be out of action for some time. Three berths was not enough to cope with the traffic expected when the pipeline was opened. Fortunately there was a relatively simple way of adding to them. Next to the oil dock at Avonmouth was a basin for dry-cargo ships where there was room for two tankers to berth. To bring this space into use all that was needed was to lay pipelines from the oil dock. It was the work of a few weeks to do this and the berths for the new tankers were ready in time for the opening of the new white oil pipeline in November. For obvious reasons these berths could not be used to discharge 'low-flash' products such as aviation and motor spirit; but these additional facilities allowed the regular berths in the oil dock to handle more of the 'low-flash' products. As for the new pipeline, this ran 105 miles from the Avonmouth storage to Walton-on-Thames, where 25,000 tons of new partly-buried storage was built; from

<sup>1</sup> See p. 144.

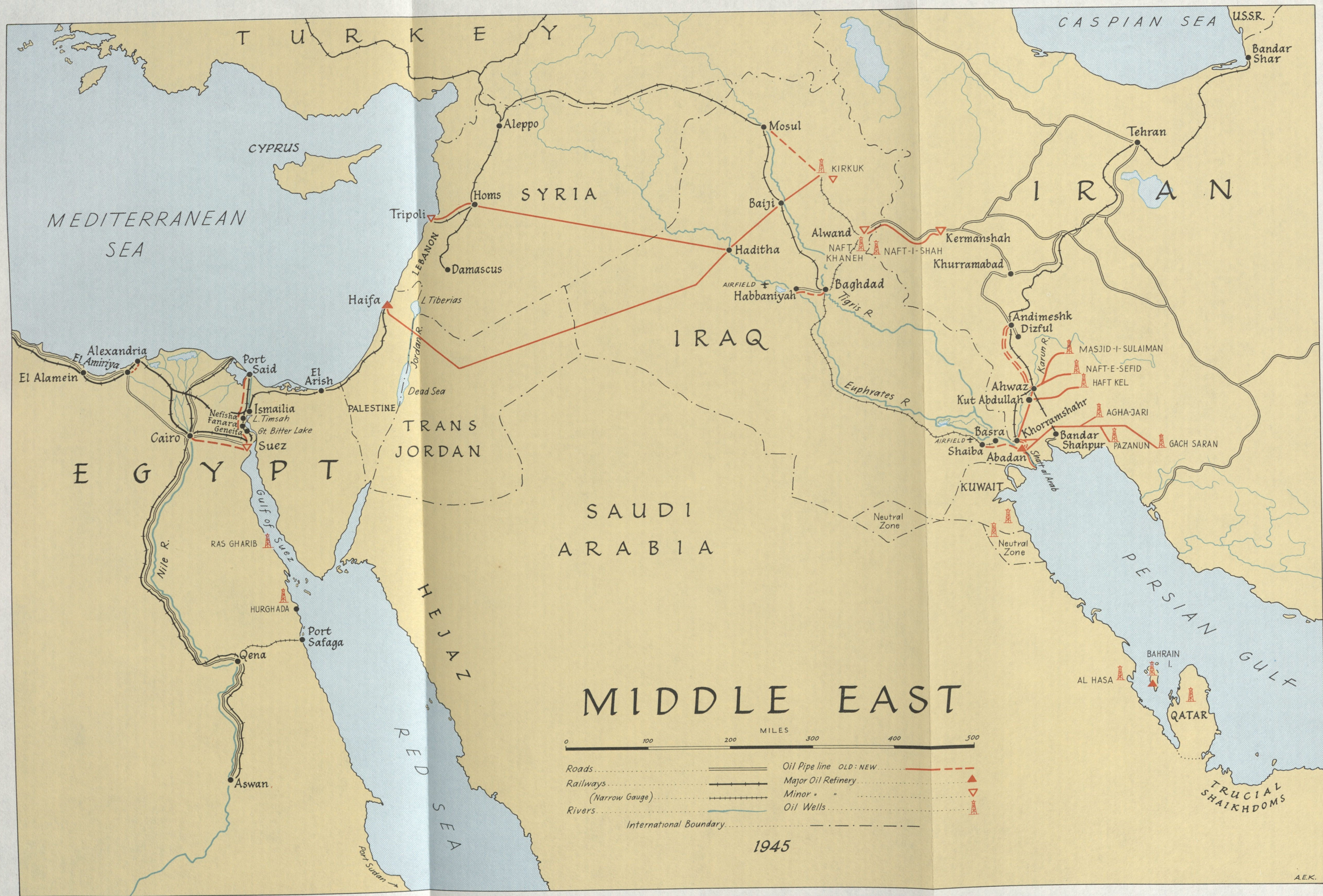
Walton-on-Thames the oil went down river by tank barge to London's riverside oil depots which had formerly received their supplies, in the same barges, up river from the Estuary. The pipeline also carried about 10,000 tons a month formerly railed from Avonmouth to the Reading area where (at Aldermaston) the Petroleum Department built 55,000 tons of new storage, partly for distributional purposes and partly as a supplement to the storage at Avonmouth.

These developments made a spectacular addition to the country's oil distribution network. But their effectiveness entirely depended on the smooth operation of a port where, in the second half of 1941, the risk of disruption by enemy action looked just as great as four years earlier, when the Oil Board first considered it. The new tanker berths, like the older ones, were within the Avonmouth dock area whose main entrance—the only one big enough for ocean-going ships—could easily be blocked by bombing. It will be remembered that the oil authorities were seeking to guard against this by building a new tidal jetty outside the dock system.<sup>1</sup> But the unhappy jetty project, which had not got under way until 1940, had run into increasing engineering difficulties. In the middle of 1941 the arrival at the Ministry of War Transport of a pre-war Chairman of the Oil Board, Colonel J. J. Llewellyn, as Parliamentary Secretary, led to the whole scheme being looked into again. At the instance of Colonel Llewellyn it was decided to abandon the idea of building a jetty and to lay down moorings instead. This was by no means a satisfactory solution; there was danger in discharging tankers in an open river where there was a 30 ft. rise and fall in the tide—indeed this was why it had been decided to build a jetty in the first place. But now moorings seemed the only feasible solution.

Even so it was clear that even this simplified scheme could not be completed for some time to come. The authorities therefore sought alternative insurance. The solution they now had in mind was to connect Avonmouth shore storage by pipeline to storage at another oil port. Two alternative proposals were considered by the Storage and Development Sub-Committee in June. One was to connect Avonmouth to the ports of South Wales. This would have had the obvious advantage of reinforcing movement facilities out of that area, where they were the limiting factor on traffic through the ports. Unfortunately it looked technically impossible to lay the line direct under the Bristol Channel, which meant that it would have to go round via Gloucester and along the coast of South Wales, a heavily built-up region. This made it too laborious to be acceptable. More attractive was a project to lay the line straight up the Severn Valley

and through Shropshire to Stanlow. The distance, between 140 and 150 miles, was about the same but the route was completely rural. This 'North-South' line, as it was called, would allow the two principal oil ports on the west coast to support each other in case of need. It could also be used to supply various reserve storage depots which the Air Ministry and the Petroleum Department owned or were building *en route*. On 30th July the Oil Control Board approved the 'North-South' pipeline in principle, the visiting Americans adding their support in August. But, as Shell-Mex House pointed out, the only cogent arguments in favour of building it were security ones. Its 80,000 tons a month capacity could contribute little to the movement of oil from the west coast under the current distribution pattern. Before giving its own sanction, therefore, the Treasury asked the Chiefs of Staff to say whether the case for it on security grounds was strong enough to justify the expenditure. At the end of August the Chiefs gave the project their blessing. Work on the line began in November 1941 and was completed in seven months.

<sup>1</sup> See p. 66.



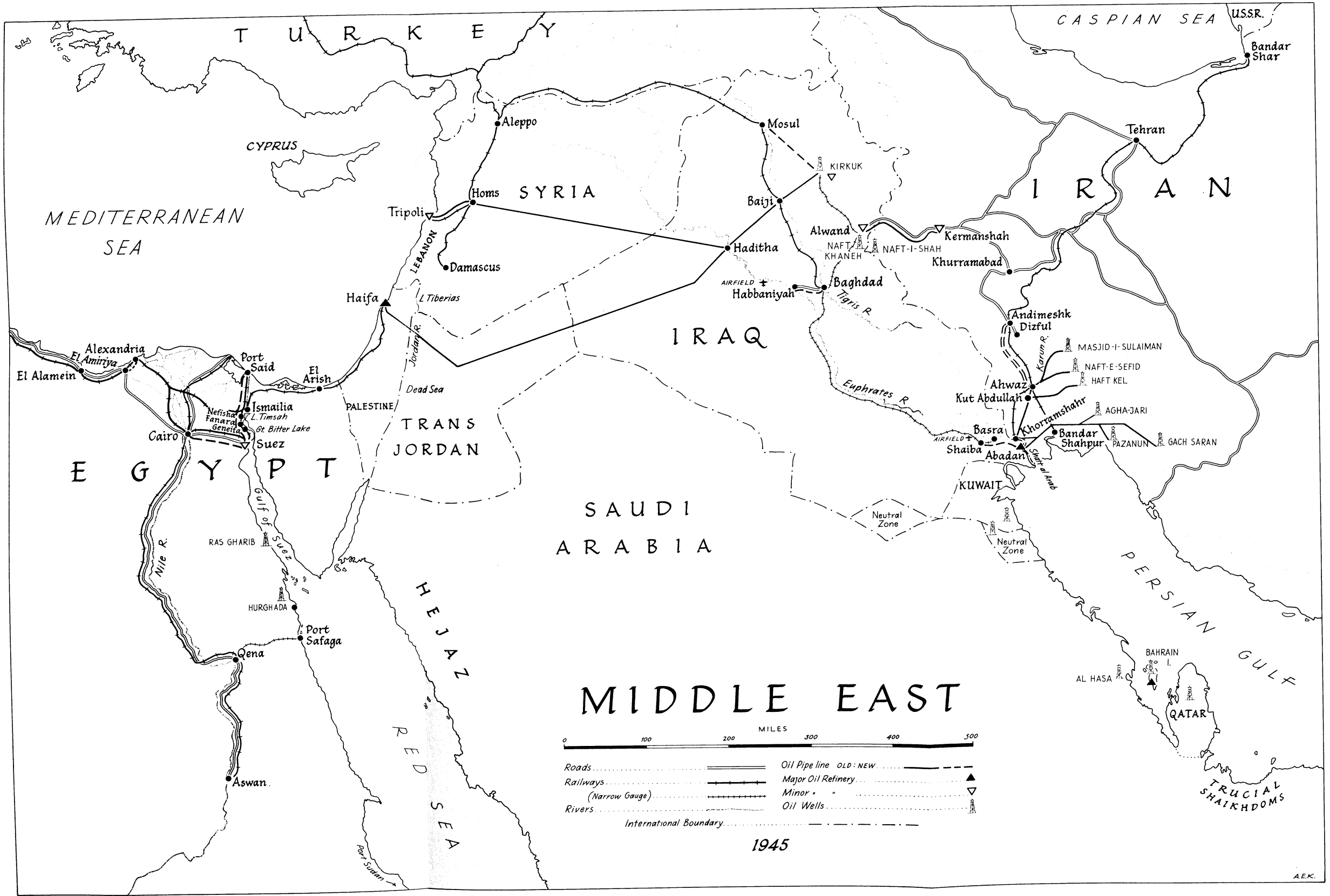
CHAPTER  
WAR IN THE MIDDLE EAST

So far this narrative has been...  
United Kingdom oil supply...  
However, the oil requirements of...  
North Africa and the Middle East...  
in London.

Although the hypothesis of a...  
of a war with Italy—had been...  
of pre-war supply planning, it was...  
planners began considering the oil...  
of the Suez Canal Zone. They...  
and Royal Air Force as a...  
between them. In those days...  
area was expected to be...  
forces in Syria covering the...  
and sufficient naval and...  
Mediterranean and North Africa...  
threat from the west. The...  
in the Canal Zone was not...  
fighting.

The modest requirements of...  
presented no supply or shipping...  
foreseen about meeting naval...  
the Committee of Imperial...  
British naval and other war...  
before war planning against...  
twenties, the British, with...  
insisted that a branch of the...  
the oil from the Kirkuk oil...  
pipeline terminate in British...  
mandated Syria, but the other,...





# MIDDLE EAST



- |                |       |                         |       |
|----------------|-------|-------------------------|-------|
| Roads          | ————— | Oil Pipe line OLD - NEW | ————— |
| Railways       | ————— | Major Oil Refinery      | ▲     |
| (Narrow Gauge) | ————— | Minor " "               | ●     |
| Rivers         | ~~~~~ | Oil Wells               | ▲     |
|                | ----- | International Boundary  | ----- |

1945

## CHAPTER X

# WAR IN THE MIDDLE EAST

(i)

### Before the War

So far this narrative has been concerned only with the story of United Kingdom oil supply. By the late autumn of 1941, however, the oil requirements of the British Armed Forces in North Africa and the Middle East were commanding urgent attention in London.

Although the hypothesis of a closed Mediterranean—the effect of a war with Italy—had been taken account of from the very start of pre-war supply planning, it was not until the end of 1938 that the planners began considering the oil implications of fighting in defence of the Suez Canal Zone. They then estimated the needs of the Army and Royal Air Force at a mere 50,000 tons of oil products a year between them. In those days the main burden of defending the area was expected to be borne by the French who had powerful forces in Syria covering the approach to Suez from the north, and sufficient naval and military strength in the western Mediterranean and North Africa to prevent the Italians posing a threat from the west. The relatively small British garrison force in the Canal Zone was not expected to engage in continuous fighting.

The modest requirements of the Canal Zone garrison clearly presented no supply or shipping problem. Nor was any difficulty foreseen about meeting naval needs in the area. The Oil Board and the Committee of Imperial Defence had taken special steps to meet British naval and other war needs in the eastern Mediterranean long before war planning against the Axis began. In the late nineteenth-twenties, the British, with strategic considerations in mind, had insisted that a branch of the trans-desert pipeline that was to carry the oil from the Kirkuk oilfields of Iraq to the eastern Mediterranean should terminate in British-mandated Palestine. When, in 1935, this pipeline came into operation, one branch went to Tripoli, in French-mandated Syria, but the other, avoiding French-controlled territory

altogether, crossed Transjordan to terminate at Haifa.<sup>1</sup> At Tripoli the French, preoccupied with their domestic refining industry, built only a small refinery to meet local needs. But at Haifa the British, again for strategic reasons, encouraged the Anglo-Iranian Oil Company and Shell to collaborate in building a 2 million tons-a-year plant to handle the total throughput of the southern branch line. Agreement between the companies and the government of Palestine was reached in March 1938, and the Haifa refinery came into operation towards the end of 1939. Like the Anglo-Iranian Oil Company's great refinery at the head of the Persian Gulf, it was designed primarily to supply oil fuel for the British navy; and the Admiralty secured a pre-emptive right to its output in time of war. But its production of white oil products was to prove of great value after the Allies were cut off from the Roumanian supplies that had met the needs of the eastern Mediterranean region in the early months of the war.

The Haifa refinery was built as a precautionary measure to strengthen a key point in British imperial communications. It provided a secure source of naval fuel nearer to the important British naval base of Alexandria than Abadan—as far by sea from the north coast of Egypt as Egypt from Britain itself. It was not until the early months of 1939 that facilities were planned in the area with a war against Italy specifically in mind. Then it was the vulnerability to air attack of the oil installations in the Canal Zone which gave rise to concern in London. To protect supplies to the Suez garrison the War Office and the Air Ministry resolved to build 'partly-buried' storage in the Zone of the kind then being constructed in the western part of Britain. Two new installations were planned, holding 26,000 tons of petrol and aviation spirit between them. One was to be located in the hills near Suez, and the other near Geneifa, twenty-five miles away to the north-west. Each was to be connected by pipeline with the petroleum basin in the port of Suez. To provide an alternative discharge point in the event of Suez being put out of action, the scheme also provided for a new tanker jetty to be constructed at Fanara on the Great Bitter Lake; this was to be connected with the Geneifa storage by pipeline.<sup>2</sup> Work on the project began shortly before the outbreak of the war with Germany.

<sup>1</sup> See Map facing p. 229.

<sup>2</sup> See *ibid.*

(ii)

### The First Twelve Months

This modest development had been undertaken in the light of strategic assumptions which ceased to be valid in the middle of 1940. The unexpected collapse of the French changed the picture in the Middle East no less radically than in western Europe itself. Freed from the threat of French troops to their west the Italians in Libya were able to build up pressure against the British in Egypt. British forces there had to be reinforced; by September 1940 the War Office was thinking in terms of a Middle East force of thirteen divisions. Petrol consumption by the Army alone was now expected to increase nearly fourfold and reach 190,000 tons a year. Reality soon outstripped even this estimate.

In December 1940 a fluctuating war of movement began in the Cyrenaican desert and continued with mounting intensity. In the course of 1941 British ground and air forces had to be deployed to cover a series of threats from the north. Despite the loss of French protection in Syria this northern flank, covered as it was by Turkey, a friendly neutral, had seemed safe enough down to the spring of 1941. But then it began to look as if the Turks might be engulfed and outflanked. In March 1941, German troops took up stations in Bulgaria; in April and May they established themselves on the Aegean, pushing the British and Greeks before them. Meanwhile German agents began to infiltrate into all the countries along Turkey's southern border. In May trouble flared in Iraq where an Axis-backed *coup d'état* was followed by an attack on the Royal Air Force base at Habbaniyah. The British hastened to close the gap, occupying Iraq in May, and after a month of fighting, Syria as well. There followed a British military build-up in both countries to guard against a German attack across Turkey. Meanwhile, on 22nd June, the Germans had invaded the Soviet Union, advancing rapidly and deeply into the Ukraine; by late November 1941 they had occupied the Crimea and reached the mouth of the Don. This posed an immediate threat to the Caucasus, and beyond that to Iran; in August, that country was occupied by Soviet and British forces. Meanwhile there had also been operations in East Africa. Beginning in August 1940 with an Italian invasion of British Somaliland these operations continued throughout the greater part of 1941, ending with the complete defeat of the Italians and the liberation of Ethiopia.

Meanwhile in all this military activity the Navy was also playing a big part. In addition to operations against the Italian fleet and in

the defence of Crete, it provided convoys for troop and supply vessels passing through the Red Sea, (now the only approach route to the Canal Zone and the eastern Mediterranean), until the successful conclusion of the East African campaign made these convoys unnecessary.

Oil consumption by military forces during this period cannot be determined exactly. Military records suggest that during the calendar year 1941 military consumption in North Africa (Egypt, the Sudan and the Western Desert) and in the Levant (Palestine and Syria) reached some 276,000 tons; aviation spirit consumption throughout the whole area may have been about 100,000 tons. Naval offtake in the eastern Mediterranean and Red Sea was between 850,000 and 900,000 tons. These figures may be compared with more than 700,000 tons of aviation spirit, some 650,000 tons of petrol, and nearly 2.1 million tons of naval fuel consumed by the Armed Forces based on Britain during 1941.

It will be apparent that oil demands of this order from the Middle East, though much larger than anything envisaged beforehand, were insignificant by comparison with the total supply programme the British had to meet. In fact the effect on the tanker situation was even less than might have been inferred from the quantity involved. Despite loss of the Roumanian supplies, there was ample refining capacity at hand in the Middle East to replace these supplies, especially with Egypt meeting an increasing proportion of her own needs from her own fields and refineries.<sup>1</sup> The construction of the Haifa refinery, so conveniently placed to supply the Navy in the East Mediterranean, has already been mentioned. Further east, at the head of the Persian Gulf, the Anglo-Iranian Oil Company's refinery at Abadan had been built up to reach a throughput capacity of 13 million tons a year at the outbreak of war. In addition Caltex had built a refinery, capable of handling over a million tons of crude oil a year, on Bahrain to treat supplies from the local oilfield, and from the nearby Saudi Arabian mainland. The main Middle East oil problem indeed, after the middle of 1940—and particularly after the final adoption of the 'short-haul' policy—was to find outlets for the oil these plants were able to produce. With the East Indies plants in normal operation it was particularly difficult to make use of Abadan's capacity. Table 14 shows the fall in Abadan's production in face of a shrinking market and the emergence of more conveniently placed eastern sources. It explains why the maintenance of Iranian oil exports to Britain weighed so heavily with the British authorities during 1940 and early 1941.

<sup>1</sup> In 1937 a rich new oilfield had been discovered at Ras Gharib and the Shell refinery at Suez was expanded to keep pace with its rising output.

The existence of these plentiful supplies so close at hand meant that London was virtually able to ignore the Middle East war from the tanker point of view. Unfortunately there are no figures of the amount of tanker tonnage engaged in Middle East supply trades before the middle of 1941, when the tanker crisis was at its height. But in the last five months of that year the average was about 320,000 deadweight tons (say twenty-five tankers or less) counting

TABLE 14  
Output of Eastern Refineries 1939-41\*

	Middle East plants			Far East plants	
		Abadan	Other plants§	East Indies plants	Other plants¶
1939	White products†	2,653	910	3,726	943**
	Black products‡	5,693	860	3,656	69
	Total	8,346	1,770	7,382	1,012
1940	White products†	1,765	1,133	3,410	951**
	Black products‡	5,720	1,647	3,685	79
	Total	7,485	2,780	7,095	1,030
1941	White products†	1,356	1,352	1,914	931**
	Black products‡	4,131	2,130	2,653	94
	Total	5,487	3,482	4,567	1,025

\* Excluding bitumen and other non-liquid products.

† Aviation and motor spirits and paraffin.

‡ Gas diesel and fuel oil and lubricating oil, including fuel oil used as refinery fuel.

§ Haifa, Suez, Bahrain (exports), Alwand, Kermanshah, and Attock (India). In addition Tripoli (Syria) produced 28,000 tons of white products, and 66,000 tons of black products in 1941.

|| British and Dutch East Indies, sterling and dollar plants.

¶ Refineries in Burma and Assam.

\*\* Including jute batching oil and motor spirit made from field gas.

the vessels engaged in local movements. This was less than a third of the tonnage operating in the British programme east of Suez.

The only measure that London found necessary in 1940 to improve supply facilities in the Middle East was the provision of extra capacity for manufacturing petrol containers. The use of portable containers is essential for supplying troops in any forward area; and in the Middle East—where the conversion of oil traffic to bulk movement had been comparatively recent—there were gaps to be filled by 'packed' traffic in the rear areas as well. For example the Armed Forces in the Suez base received most of their supplies in this form. As part of their pre-war preparations the War Office had erected a number of plants in Britain between 1935 and 1940 to manufacture 4-gallon petrol tins, adopted as the standard Army container in

1935. In February 1939 it was suggested that one such plant should be erected in Egypt as well to meet the needs of the Forces in the Canal Zone. This suggestion was not taken up. There were, in fact, plenty of civilian tin-making plants at the main ports of Egypt, Syria and Palestine, unused because of the recent conversion to bulk movement in these countries. These facilities the British forces pressed into their service when fighting began in 1940. Subsequently the War Office arranged for eight new tin-making plants to be despatched to the area.

The main concern of the oil authorities in the first twelve months of the Middle East campaign was to guard against the effects of air attack. Both Haifa and Suez were well within range of enemy aircraft. Late in 1940 the Italians made a series of raids on Haifa port and refinery and succeeded in destroying some storage. They also attempted to block the Suez Canal by minelaying from the air; early in 1941, through traffic was interrupted a number of times.

In the spring of 1941 the Admiralty, alarmed by these attacks, decided to provide insurance against a temporary closing of the Canal. It used stocks of Army pipe to lay a pipeline alongside the Canal from Suez to Port Said where the Navy was renting commercial bunker storage. The pipeline was capable of passing 30,000 tons of fuel oil a month, which was about half the rate of consumption by the fleet in the eastern Mediterranean. The pipeline was completed in October 1941.

The other two Services had a different problem. The Forces in the Canal Zone were supplied directly through the port of Suez and were thus independent of the Canal. But Suez itself was vulnerable from the air and was in fact to be heavily raided late in 1941. The pre-war scheme to provide against this was still incomplete when fighting broke out; it was not until mid-1941 that all the storage, together with the new Fanara jetty, was finished. Nevertheless the War Office had immediately set about expanding it to take account of the new scale of consumption expected. The previous October it had placed an order in Britain for twenty-six new storage tanks, each capable of holding 6,000 tons of petrol, which it intended to install as partly-buried capacity. Meanwhile the Oil Control Board authorised a programme to build splinter-proof brick walls around all the surface storage and refinery plants in the area—the cost, in most cases, being met in part by the British government. Ultimately some 300 tanks with a storage capacity of some 2 million tons were protected in this way.<sup>1</sup>

<sup>1</sup> Located at Haifa, Tripoli (Syria), Beirut, Suez, Alexandria, Port Said, Cairo and Ras Gharib, at Port Sudan and Aden. Splinter-proof walling was also erected round tankage at Abadan, and Bahrain, at oil depots up country in Iran and Iraq, at Mombasa, Takoradi and Apapa and on the Malay Peninsula and adjacent islands.

The Forces in the Western Desert were even more dependent than the Navy on the smooth functioning of the Canal and of Haifa. For if these points had been put out of action all their supplies, hitherto mostly routed through Alexandria, must also have gone through Suez together with all civil imports into Egypt, and would have had to be transferred overland across the country. The Egyptian transport system could not have coped with such a contingency. Consequently, in August 1941 it was suggested that Suez should be connected direct with Cairo by pipeline, and the line be continued on to Alexandria, a total length of 240 miles. The Navy strongly favoured this project; for they saw in it a way of keeping tankers carrying petrol and aviation spirit out of Alexandria harbour, which was their main base in the Middle East. But supplies of pipe were limited; and in December 1941 it was decided that they could be more usefully used elsewhere.

(iii)

### The New Committees

By the autumn of 1941 it had become apparent that a major oil transport problem was arising in the Middle East. In the Western Desert the British were preparing a new offensive—this was in fact launched on 18th November. On the northern approaches all was now quiet; but, after the Moscow Conference of September 1941 there was an imminent possibility that the Soviet forces in northern Iran, and even in the Soviet Union itself, might receive oil supplies across country from Abadan. There were also the needs of the British forces newly stationed in Iraq, Iran and Syria to be considered. It was clear that extra oil distribution equipment was going to be needed which could be, and would have to be, secured from the United States. Responding to this situation the Petroleum Department initiated a series of meetings in London with the Service Departments and oil company representatives. It was established beyond doubt that oil transport across Iran was inadequate. Pending more detailed consideration of the problems of the region as a whole, the Petroleum Department accordingly sponsored a huge order for American equipment. This was ultimately placed by the Ministry of Supply and included 600 miles (later increased to 760 miles) of 6-inch pipe with ancillary fittings, and storage tanks, plants for manufacturing portable drums and cans, and vehicles for carrying oil in bulk.

These meetings marked the beginning of a new phase in the handling of oil supply problems in the Middle East. Hitherto the War Office had borne the responsibility for the ordering of oil equipment from both British and American firms, and for carrying through development projects. It now saw the advantages of regular consultation with civilian experts. In October 1941, after some discussion with the Petroleum Department, the War Office therefore proposed that a new sub-committee of the Oil Control Board should be set up to 'consider and assist in promoting' the supply of oil and oil equipments as required in the Middle East. The Oil Control Board accepted this suggestion early in the following month. In the meantime the new body had already come into existence. It was called the Overseas Development Sub-Committee and was made up of representatives of the three Service Departments and the two principal 'sterling' oil companies operating in the Middle East—the Anglo-Iranian Oil Company and Shell; the Chairman was a civilian expert from the Admiralty appointed by the Chairman of the Oil Control Board. For the next twelve months this new sub-committee met at the Petroleum Department almost every fortnight; its main concern was with the procurement and allocation of the equipment that had been ordered from the United States.

Meanwhile co-operation between military and civilians was extended into the Middle East itself. Early in December 1941 a Petroleum Conference was held in Cairo. It was attended by local oil company and military representatives and the Petroleum Department sent its own representative from London. The Conference made the first detailed and co-ordinated survey of the future oil requirements of the region as a whole; reviewed all development proposals and schemes in hand; and set up machinery through which the local co-operation it had initiated could be continued. This machinery took the form of two new Petroleum Advisory Committees, one established in Cairo with responsibility covering North Africa, Syria and Palestine; and one in Baghdad to cover Iran and Iraq. Their work ranged over all aspects of oil supply, except shipment; they also had to consider air raid protection measures and the denial of oil facilities to the enemy.

Like the Overseas Development Sub-Committee these committees were made up of oil company and Service representatives;<sup>1</sup> and were presided over by a Petroleum Department nominee, who was the executive focus of their activity. These were crucial appointments; the Cairo Petroleum Conference had regarded the chairmen as the linchpins of the new machinery. The Petroleum Department chose former oil company executives with appropriate local experi-

<sup>1</sup> Including the American armed forces after the United States entry into the war.

ence. The Baghdad Advisory Committee held the first of its monthly meetings on 29th December 1941; the Cairo Committee began work three weeks later. Down to January 1943 the Baghdad Committee was assisted by a subordinate committee meeting at the British Legation in Tehran; later the main committee, while still based on Baghdad where military headquarters was located, met frequently in Tehran itself.

Both the Cairo and Baghdad Committees continued to function until the end of the war. But the activity of the Overseas Development Sub-Committee in London died down after the American equipment had all been secured and allocated to projects. Though never formally wound up, it ceased to meet after July 1943.

One final point needs to be made. Neither the Overseas Development Sub-Committee nor its regional offspring were directive bodies. Their function was to co-ordinate and give advice. Through their meetings and by means of progress reports they kept everyone concerned, from the Oil Control Board downwards, in touch with what was being planned and done, and with problems as they arose; with the aid of technical sub-committees they also acted as sources of expert opinion. But the War Office kept its control over the disposal of oil equipment in the Middle East. Out of the 760 miles of pipe obtained from the United States it was able to insist, in the teeth of strong disapproval from the Petroleum Department, that 200 miles should be used to carry water supplies for the Army.

(iv)

### Iraq and Iran

What were the problems these committees had to tackle during the closing weeks of 1941? So far as the Allied forces in Syria were concerned oil supply presented no great problem. Supplies to forward areas could be delivered by sea to Tripoli, from where a major road and rail system ran northwards to the Turkish frontier. To allow the Armed Forces to take advantage of this, some of the crude oil storage at the small French distillation plant at Tripoli was converted to holding petrol and aviation spirit. Plans to lay pipelines to ease railway congestion north of the Turkish frontier or, alternatively, if northern Syria were overrun, to supply an army through Beirut, were drawn up; but they never had to be put into effect.

Inland to the east, however, in Iraq and Iran, there was no alternative to the development of the inland transport network. In Iraq

the stationing of troops in the north meant that oil supplies had to be distributed not only to these forward areas, which were relatively far from refinery sources, but also to the south and centre of the country to meet the fuel needs of transport carrying military stores up from Basra. The authorities sought to supply the oil needs without adding to this flood of other traffic. Aviation spirit was supplied from Abadan (the only source of supply) by tank barge through Basra to Baghdad and beyond, by way of the rivers Shatt-al-Arab and Tigris.<sup>1</sup> Additional requirements of other products in the centre and north were met by expanding refinery production north of Baghdad. At Alwand, one hundred miles to the north-east of the capital and on the railway line to Kirkuk was a small refining plant fed from the local oilfield of Naft-Khaneh and built to supply the normal civil needs of the region. This plant was modified to raise its output from 50,000 to 70,000 tons a year. In addition a thirty-mile long pipeline was laid to another distillation plant in Iran, fed from the same oilfield. This meant that extra supplies could be delivered at need from Iran into central Iraq.

But the main improvement was further to the north. Here, in the main Kirkuk oilfield (from which the crude oil was piped to Haifa and Tripoli), the Iraq Petroleum Company had a plant to extract sulphur from the crude oil. This was converted into a distillation plant, with an estimated potential output of 250,000 tons of petrol a year, and connected by pipeline to the main forward military base at Mosul, 110 miles to the north-west. All this work was done with spare equipment to hand, and the new facilities were ready for use by the spring of 1942.

Development was also going ahead during this time in Iran, where the Cairo Petroleum Conference had estimated that non-military oil consumption alone would be 200,000 tons above its 1940 level by the spring of 1942. Iranian requirements, like those of Iraq, were normally supplied partly from Abadan and partly from a small up-country plant at Kermanshah, which was fed, like Alwand, from the central oilfield (here called Naft-i-Shah).<sup>2</sup> Kermanshah was too far from the main transport network of the country to make it worth while to expand its output; and it was planned to draw all the additional requirements from Abadan.

The Abadan refinery, sited for the convenience of export traffic, was connected with the interior of Iran neither by rail nor road at the end of 1941. The nearest railhead was at Ahwaz, on the main line from Tehran to Bandar Shahpur—the main Iranian port on the Gulf. A pipeline capable of carrying 200,000 tons of petrol and

paraffin a year ran from Abadan to Ahwaz; another link was the river Karun up which fuel oil for the Iranian railways was carried by tank barge. Closer examination made it clear that there would be no difficulty in moving additional supplies between these points. The pipeline was large enough to accommodate the extra petrol needed for the road transport lift across Iran. Fuel oil which could not be carried by barge could be pumped backwards up the main crude oil pipeline which led from the oilfields by way of Ahwaz to Abadan; this was possible, of course, because the refinery was working far below capacity.

It was north of Ahwaz that a problem arose. Between here and the town of Andimeshk the only existing transport link was the railway which normally carried oil supplies for Tehran. From Dizful, near Andimeshk, a main road also ran up to Tehran. With a heavy flow of supplies for Russia streaming up from Bandar Shahpur it was clear that the Ahwaz–Andimeshk rail link would be the most heavily congested section of the supply route, and that it would have to be relieved of oil traffic. Accordingly it was decided to lay two pipelines between these points, each with a throughput capacity of 200,000 tons a year. The two lines, one carrying white products, and one carrying black, were already in use by May 1942.

(v)

## Egypt

In Egypt, the main theatre of active operations in the Middle East, there was no comparable build-up of land transport facilities specifically to meet new demands. This was not because there were no increased supply tasks. During the twelve months from August 1941 some 342,000 tons of oil products were delivered to the Army and Royal Air Force in the Western Desert. Meanwhile Egyptian civilian demand rose steadily; and the increasing output of the Ras Gharib oilfield had to be delivered to the refineries at Suez.

But none of this raised big transport problems. The Egyptian railway system was able to cope with the increased civilian demand, and other supplies were carried by sea. A shuttle service of small tankers moved the crude oil up the Red Sea from Ras Gharib to Suez. Supplies for the Army and Royal Air Force in the Western Desert, even when drawn from nearby Haifa, were all shipped direct to Alexandria; from there they were carried to the forward area, mostly in 'packed' form, by road (or by rail as far as the railhead at Mersa Matruh); alternatively the oil was shipped forward

<sup>1</sup> See Map facing p. 229.

<sup>2</sup> See *ibid.*

in small tankers to Tobruk and Benghazi whenever those ports were in British hands.

Only one supply problem worried the authorities at the end of 1941: the movement of oil through Alexandria. In the first place Alexandria was at the wrong end of the Suez Canal, now the only sea approach to the eastern Mediterranean open to the British. Shipping supplies to Alexandria from the Persian Gulf—through the Suez Canal and on by convoy from Port Said—added eight days to tanker round voyages compared with shipping them to Suez during 1941. Secondly, there were delays at Alexandria itself. By the autumn of 1941 this port had become a bottleneck, unable to receive white products at a greater rate than 15,000 tons a month. This poor performance of Egypt's largest oil port was due to the attitude of British naval authorities to tankers carrying 'low-flash point' products into Alexandria harbour. Before the war successive naval commanders had protested with increasing emphasis at the prospect of having cargoes of white oils unloading in Alexandria harbour in war-time. Their protestations had prompted a scheme for building a new petroleum basin at Mex, some five miles to the west of the main harbour area. But this would have been very expensive and would have taken five years to complete. The authorities therefore contented themselves with building a wall round the installations and an oil boom in the harbour. In those days, of course, the authorities, not foreseeing a Western Desert campaign, were thinking only of civilian traffic; and they planned to limit this to the paraffin needed in the immediate vicinity of the city.

When war came to the Middle East all the tanks near the Alexandria waterfront were emptied; and only tankage situated on land sloping inland away from the harbour was allowed to be used for the storage of white products. At the same time very strict restrictions were introduced on tanker handling. Tankers with white oil cargoes were only allowed into the port one at a time; and were not allowed into it at all during the two weeks out of four that the moon shone at its brightest. They were allowed to discharge only during daylight; at four p.m. they had to leave the berth for an outer anchorage where they remained until it was light again. Between March and December 1941 tankers unloading at Alexandria took an average of nine days to discharge their cargoes and clear the port.

It was impossible to allow this situation to continue. Not only were the delays to tankers unacceptable at a time of tanker shortage but—even more important—the throughput capacity of Alexandria was restricting the rate at which petrol and aviation spirit could be supplied to the Western Desert. The proposed pipeline from Suez to Alexandria would have been a solution. Failing this the Navy agreed to an oil companies' proposal that white oil tankers should

also be allowed to discharge at a jetty at Mex, formerly used by Egyptian oil companies which the war had put out of business. This suggestion was put into effect at the start of 1942, the storage at Mex being connected by pipeline with the main installations at Alexandria harbour. The result was disappointing since the water at the jetty was not deep enough for fully-laden tankers; these still had to discharge part of their cargoes in the main harbour under all the restrictions that were enforced there. Accordingly, a new tanker berth was built at Mex at a point where the water was deeper. This was completed in the spring of 1942.

(vi)

### Container Problems

It was not only facilities to handle oil in bulk that needed to be expanded late in 1941. More containers for 'packed' movements were needed as well. In northern Iraq, in particular, where there was no bulk storage, the Armed Forces had to accumulate all their stocks in cans. For this reason the American equipment ordered in late 1941 included the components of twelve plants to manufacture 4-gallon petrol tins. To fill the gap until this arrived arrangements were made to move container plants from India and elsewhere to the Middle East.

In the course of 1941 however the British forces in North Africa had become thoroughly dissatisfied with the 4-gallon 'flimsy', as it was called. Adopted mainly because they were cheap to make, the 'flimsies' were awkward to handle and easy to damage. They also let in water, which meant that they could not be piled in open-air dumps. Furthermore the quality of those in the Middle East was particularly bad because of the age of the tin-making plants in the area and the inexperience of their operators. A report in December 1941 asserted that 30 per cent. or more of the petrol despatched to the Forces in the Western Desert in 'flimsies' had been lost by leakage.

Both the Army and the Royal Air Force sought to replace the 'flimsy' as quickly as possible. The Royal Air Force, which did not have to manhandle its fuel to the same extent as the Army, was able to use 36-gallon steel barrels to move aviation spirit forward to its airfields. Barrels of this kind were used in the Middle East for distributing bitumen and manufacturing plants were located at the Abadan and Suez refineries. At the end of 1941 the Royal Air



Force asked for 80 per cent. of its fuel requirements in Iraq to be delivered in barrels. This extra demand for barrel shipments coincided with a big rise in bitumen requirements for roads and airfields throughout the Middle East and particularly in Iraq and Iran.<sup>1</sup> The Anglo-Iranian Oil Company therefore placed orders in Britain for plants to double its capacity to make 36-gallon barrels; it followed this up, in the spring of 1942, with an order for four barrel-making plants from the United States.

The Army, however, needed a portable container and wanted one sturdier and handier than the 'flimsy'. It had no doubt about what that should be. In August 1941, the Germans, retreating for the very first time before the British, had left behind them some 80,000 petrol cans. These Jerricans, as they came to be called, were twenty-litre steel containers shaped like suitcases, which made them both easy to handle and economical of transport space. The British army was enthusiastic about them and recommended their adoption as the standard British container. The War Office promptly placed orders for a number of Jerrican manufacturing plants both in Britain and in the United States. But it was obvious that these would be a long time in coming. The Americans reported that the heavy presses needed to make Jerricans would not be available for at least ten months. In the meantime they offered to deliver plants to manufacture United States Army standard containers. These were small steel drums with a capacity of 5 U.S. gallons.<sup>2</sup> They were not nearly as good as the Jerricans; for one thing, they were round and therefore took up more space. But they could reach the Middle East by mid-1942; and since they were very much better than the 'flimsies' it was decided to accept them pending the time when the Jerricans would be available in quantity. In December 1941 an order for ten manufacturing lines was placed in the United States; at United States suggestion this was increased to twenty plants in February 1942.

## APPENDIX IV

### Tanker Statistics 1939-41

TABLE 15

*World Tanker Tonnage at 30th June 1939*  
(Tankers of 1,600 gross tons and over)

	Number	Gross tons‡
British Empire*†	453	3,209,000
France†	43	294,000
<b>Total Allied</b>	<b>496</b>	<b>3,503,000</b>
Norway	268	2,107,000
Holland	107	539,000
Sweden	19	159,000
Denmark	13	105,000
Belgium	9	66,000
Other non-Axis European	49	252,000
<b>Total European neutral</b>	<b>465</b>	<b>3,228,000</b>
U.S.A.*	377	2,755,000
Panama	53	469,000
Other western hemisphere	54	216,000
<b>Total western hemisphere neutral</b>	<b>484</b>	<b>3,440,000</b>
Germany	32	249,000
Italy	82	426,000
Japan	45	429,000
<b>Total Axis</b>	<b>159</b>	<b>1,104,000</b>
<b>World Tonnage</b>	<b>1,604</b>	<b>11,275,000</b>

\* Excluding tonnage trading on the Great Lakes.

† Tonnage on 2nd September 1939.

‡ The average deadweight tonnage of a tanker was approximately one half more than her gross tonnage.

<sup>1</sup> Barrels for carrying aviation spirit had to be made of heavier 18 gauge sheet metal instead of the 21 gauge used for barrels containing liquid bitumen, and 24 gauge for those made to hold solid bitumen. They therefore took longer to make.

<sup>2</sup> Just over 4 Imperial gallons.

TABLE 16

Tanker Losses 1939-41\*

000 d.w. tons

	British-controlled Tankers		Non-controlled tankers in Allied trades†
	British flag	Other flag	
September–November 1939	72‡	nil	21
December–February 1940	152	nil	nil
March–May 1940	51	nil	29
June–August 1940	226	72	68
September–November 1940	184	66	60
December–February 1941	200	12	79
March–May 1941	343	175	nil
June–August 1941	59	57	nil
Total September 1939– August 1941	1,287	382	257
September–November 1941	143	10	26

\* Tankers of 1,600 gross tons and over. Includes marine losses as well as war losses, and Admiralty tankers as well as freighting tankers.

† Including French tankers.

‡ Including one tanker seized in Germany at the outbreak of war.

TABLE 17

Tanker Gains 1939-41\*

000 d.w. tons

	British		Foreign vessels taken on time-charter		
	New building	Other†	Norwegian‡	Dutch	Other§
Sept.–Nov. 1939	52	} 91	55	nil	nil
Dec.–Feb. 1940	24		384	nil	nil
March–May 1940	10	88	463	11	15
June–Aug. 1940	nil	100	406	480	45
Sept.–Nov. 1940	44	9	98	nil	7
Dec.–Feb. 1941	36	45	28	nil	9
March–May 1941	72	22	11	nil	37
June–Aug. 1941	126	nil	102	nil	8
Total	364	355	1,547	491	121
Sept.–Nov. 1941	114	30	21	nil	15

\* It should be noted that many of the tankers transferred to the British flag or time-chartered during this period were already working partly or wholly in Allied trades.

† Other gains include transfers of flag, vessels taken in prize or requisitioned, and vessels purchased. Excluding Panamanian tankers made available by the Americans in 1941 and transferred to the British flag, but remaining under the control of the United States Maritime Commission.

‡ Norwegian tankers chartered on 'Scheme' terms, i.e. this excludes Norwegian tankers made available partly or wholly under lend-lease in 1941 ('Plan' and 'Quad'). It also excludes tankers on pre-war time-charter to British companies which were taken over in this period by the Ministry of War Transport.

§ Includes Swedish, Belgian, Greek and Panamanian tankers.

TABLE 18

Foreign Tanker Tonnage brought under British Control\*

September 1939–December 1941

	No.	G.T. 000 tons	D.W.T. 000 tons	
Belgium	4	25	38	Taken on time-charter
Denmark†	8	66	102	Requisitioned
Finland	1	7	10	Prize
France	10	62	92	Requisitioned
Germany	1	6	9	Prize
Greece	3	16	24	Taken on time-charter
Italy	5	24	36	Prize
Netherlands‡	50	336	491	Taken on time-charter
Norway§	132	1,038	1,568	1 transfer of flag, 131 taken on time-charter
Panama	7	80	136	4 transfer of flag, 3 taken on time-charter
Roumania	2	11	18	Requisitioned
Sweden	2	20	30	Taken on time-charter
U.S.A.	3	17	26	Purchased
Total	228	1,708	2,580	

\* Excluding United States assistance tonnage.

† Includes one tanker transferred to South African flag in September 1940.

‡ 8 of 85,000 deadweight tons were time-chartered to the Ministry of War Transport. The rest, owned by Shell, were subjected to British licensing control from July under the agreement with the Dutch government.

§ Excluding 38 tankers on pre-war charter to British companies, and 11 tankers on 'Montreal' service. Excluding also 28 Norwegian tankers provided on 'Plan' and 'Quad' terms in 1941, but including one tanker, the *Kongsten*, transferred to British flag in October 1939 as the *Athelchief*.

|| Excludes Panamanian tankers provided by the Americans under lend-lease in 1941.

TABLE 19

Tanker Tonnage under British Control 1939-41

(1,600 gross tons and over)

000,000 d.w. tons

September 3rd 1939	5.3
March 1st 1940	5.5
July 1st 1940	6.3
October 1st 1940	6.9
January 1st 1941	6.9
March 15th 1941	6.8
June 15th 1941	6.5
September 15th 1941	6.8
December 15th 1941	6.9

TABLE 20

*Summary by Flag of Tankers in British Programme at 15th December 1941\**  
(1,600 gross tons and over)

		Number	Deadweight tonnage
British Control	Total	654	6,852,000
	United Kingdom†	392	4,034,000
	Other Empire	35	336,000
	Belgian	4	36,000
	Dutch	62	503,000
	Greek	2	16,000
	Norwegian	154	1,850,000
	Panamanian	3	47,000
Swedish	2	30,000	
Allied Control	Total	74	735,000
	Belgian	1	15,000
	Dutch	30	124,000
	Greek	1	8,000
	Norwegian	42	588,000
Neutral Control	Total	23	270,000
	United States	4	48,000
	Panamanian	18	212,000
	Argentinian	1	10,000

\* Excluding United States Shuttle tankers.

† Including seven Panamanian tankers temporarily on British register.

## PART IV

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## After Pearl Harbour Winter 1941—Spring 1943

## CHAPTER XI

# ANGLO-AMERICAN PARTNERSHIP

(i)

### Foundations

ON 8th December 1941 Japan launched her attack on the British and Americans; three days later Germany and Italy supported their Axis partner by themselves declaring war on the United States. At a stroke the working partnership between the two countries was transformed into a full war alliance.

From start to finish this war-time collaboration was conceived, not as a fusion of effort and resources, but as a co-ordination of separate efforts by partners of equal status and responsibility. So far as oil supply was concerned, for instance, London and Washington each retained its own separate sphere of responsibility. Each centre organised loadings and shipments within the framework of a separate supply programme. Allied tanker tonnage was divided into two separate fleets, one directed from London, the other from Washington.

The actual division of responsibility was determined largely by historical factors. At the time of Pearl Harbour the British were organising the supply of almost the whole of the eastern hemisphere outside the Soviet Union and the Axis countries. The countries concerned were Empire countries, dependencies of Allied countries, and those Middle East countries where British forces were stationed. The Americans, for their part, had taken responsibility for supplying the whole of the western hemisphere, including Canada and the West Indies, in order to lighten the supply burden on London and to release tankers for service elsewhere. With the United States entry into the war American military and naval consumption spread beyond the Americas to Australasia and, towards the end of 1942, to the United Kingdom itself. This confronted the oil authorities with an important administrative choice: whether to allot supply responsibility on a user or on an area basis. There were obvious disadvantages about having two separate supply programmes for a single area; for instance it would make it more difficult to use tanker tonnage economically. Moreover the corollary of such a system—

segregation of supplies within the area—would have wasted storage space and made distribution more complicated and difficult to organise. Accordingly, (except for special reasons in Australia and New Zealand,)<sup>1</sup> the area principle of supply was adopted. In Britain the Americans pooled their stocks with the British and their needs were incorporated into a single programme of requirements which London was responsible for meeting. The same thing happened in other British supply areas in Asia and Africa. On the other hand, when a new joint theatre of war was opened up in North Africa it was agreed, in January 1943, that Washington should be the sole supply authority. Finally, in the autumn of 1944, even Australia and New Zealand were brought into line with this area principle when, as part of the preparations for greater British participation in the Pacific war, London took over responsibility for meeting all oil requirements in those two countries, and Washington undertook responsibility for provisioning British forces in the Pacific war areas.

These arrangements have been described at this point because knowledge of them is essential to an understanding of the scope and limitations of Anglo-American war-time collaboration in oil matters. The arrangements are stressed also because they do, to some extent, affect the compass of this work. Hitherto the theme has been British oil requirements in war and the administrative measures that were taken to meet them. The two parts of this subject—demand and supply—fell naturally together as long as the supply of all British oil needs was organised from London. But with large British forces operating within Washington's supply orbit, and large American forces operating within London's, it is clear that the scope of this narrative must be redefined. Since this is the history, not of a branch of the British war effort *in toto*, but of a branch of British war administration, it is evident what its theme must now be: the administrative task that was performed from London. It will be concerned with all demands, British and American, Allied or neutral, falling within the London supply area. Washington's arrangements, even on behalf of British consumers, will be referred to only in passing to illuminate the problems faced and dealt with in London.

So much for the way in which the two Allies shared out the work: it remains to look at the machinery through which they sought to co-ordinate their separate efforts. The War Cabinet in London began thinking about co-operation with the Americans—though not specifically in relation to oil—almost from the morrow of Pearl Harbour. On 13th December 1941, a British party led by the Prime Minister set sail for America in the battleship *Duke of York*. By the time the battleship arrived the Prime Minister's party had already

drafted a scheme for combined organisation as a basis for discussion. At the conference which followed the two countries agreed to set up four new 'combined' bodies. A Combined Chiefs of Staff organisation to co-ordinate strategy; a Combined Munitions Assignments Board, working under the direction of the Combined Chiefs of Staff, to allocate 'finished war materials' from the resources of the two countries, henceforth 'deemed to be in a common pool'; a Combined Raw Materials Board to plan and make recommendations on the 'development, expansion, purchase or other effective use' of the raw material resources available to the alliance; and a Combined Shipping Adjustment Board to integrate the operations of Allied merchant ships, including tankers. Later, to cover the gap between mobilisation of raw materials and the assignment and shipment of finished products, a Combined Production and Resources Board was set up on 9th June 1942. On the same day a Combined Food Board was created.<sup>1</sup>

None of these bodies, as first conceived,<sup>2</sup> was concerned with mineral oil. Nor did the British and Americans ever set up a Combined Oil Board. The contrast with the earlier Anglo-French arrangements makes this omission worth noting. A number of things contributed to it. One was the empirical approach of both British and Americans to organisational problems. The Anglo-French war control, largely inspired and shaped by the French, had been designed as a comprehensive system to take account of all aspects of the economy of war. The British and Americans confined themselves to setting up combined committees to deal with the problems as they saw them. The Combined Raw Materials Board, for instance, was created in face of prospective shortages of rubber and tin arising from Japanese successes in the East Indies. The Combined Shipping Adjustment Board was provided because the availability of shipping resources seemed likely to be the limiting factor on supplies to the war fronts. No similar problem faced the oil authorities. The loss of the East Indies subtracted little from world oil producing and refining capacity. At the beginning of 1942, and for a long time afterwards, oil supplies seemed ample—with the exception of aviation spirit. There was no urgent need to organise production on a combined basis; and in these circumstances the instinct of administrators on both sides of the Atlantic was to let well alone.

The Americans, indeed, would have been hard put to fit their own administrative arrangements in with those of the British under a Combined Board. Their machinery, like that of the French two years earlier, was divided between civilian and Service authorities. The

<sup>1</sup> W. K. Hancock and M. M. Gowing, *op. cit.*, Ch. XIII.

<sup>2</sup> Aviation spirit later came within the purview of the Combined Munitions Assignment Board, see p. 261.

<sup>1</sup> See below p. 346.

Petroleum Co-ordinator for War would have been the obvious candidate to sit with the representative of the Chairman of the Oil Control Board on a supreme Combined Board. But he was responsible only for production, and for supplying civilian needs within the United States and the needs of other countries of the western hemisphere. He took no part whatever in supplying the American Armed Forces who, like the French Services before them, kept their civilians completely in the dark about their stocks, consumption and forward requirements. Moreover, even within the civilian field the powers of the Office of Petroleum Co-ordinator were too limited at the start of 1942 for it to function as an effective part of an inter-Allied control system. During the first three months of the year its jurisdiction over production and refining carried on by American oil companies outside the United States was being disputed by another agency—the Board of Economic Warfare. Even after winning this battle the Office of Petroleum Co-ordinator still had no executive authority within its own field; in 1941 the American oil industry had been judged to need ‘guidance’ rather than control. The Office’s efforts to become an executive agency were fiercely resisted by other Government agencies which would like to have seen the Office absorbed into the newly-formed War Production Board.<sup>1</sup> Not until December 1942 did the Petroleum Co-ordinator’s office get the powers it sought—together with a new title: the Petroleum Administration for War.

But if, on the American side, administrative obstacles reinforced an ingrained preference for the ‘*ad hoc*’ approach, on the British side too there was more than a habit of mind involved. There was tactical instinct as well. In the procedures of a combined committee British and Americans would have confronted one another from prepared national positions in circumstances which would dramatise differences and give natural conflicts of interest the character of a national conflict of wills. In such collisions it was the British who would have had to give way, just as the French had done to the British two years earlier, and for the very same reason—their dependence on supplies controlled by their partner.

For this reason the British felt it safer to operate through informal and less conspicuous channels. Indeed, there are indications that London would have been happy to have operated this way in respect of all commodities. ‘We feel’, the War Cabinet cabled to the British in Washington on 20th December 1941, ‘that it would be best to avoid, at any rate at first, the establishment of formal Allied co-ordinating bodies and to proceed by way of the development and adaptation of existing liaison missions’. The War Cabinet may not

have grasped at this stage the full implications of the economic disparity between the two Allies. They seem to have contemplated that London would remain an important focus of decision-making. They would welcome, said the War Cabinet, ‘the appointment . . . to London of representatives authorised to enter into definite engagements on behalf of the competent United States agencies on such questions as shipping, food, raw materials, oil. . . .’ But the British oil people in Washington already had a clearer understanding of the facts of life. They had already begun to feel their way towards a relationship which was lucidly analysed by Sir Arthur Salter in a memorandum circulated some ten months later. ‘It must be accepted’, Sir Arthur Salter wrote, ‘that policy will be largely and increasingly decided in Washington. To proceed as if it can be made in London and “put over” in Washington, or as if British policy can in the main develop independently and be only “co-ordinated” with American—is merely to kick against the pricks. Policy will be increasingly “Washington” made policy. But it need not therefore be American. It may be “Anglo-American”. British policy can be fused with American and the British point of view and British interests form an adequate part of the policy that ultimately determines action. But if this is to be possible it is essential that . . . British views should be fused with American while American policy is still in the making and fluid.’<sup>1</sup> Sir Arthur Salter was speaking generally, but he describes the essence of the Anglo-American relationship in oil and tanker affairs as it was to develop.

Preference for informal collaboration was equally noticeable in tanker administration. True, a formal body, the Combined Shipping Adjustment Board, included among its responsibilities the task of ‘tanker allocation in co-operation with the other agencies involved’. But despite one or two attempts by the London branch to bring up tanker questions in its very early days, the Board paid little attention to tankers, and took no important decisions which concerned them.<sup>2</sup> Lacking the guidance of an inter-Allied oil body the Board was clearly in no position to rule on the allocation of tanker resources between routes and services. The Board was not even asked to do so: oil programmes were specifically excluded from the ‘programmes of requirements and supply’ its terms of reference enjoined it to

<sup>1</sup> Sir Arthur Salter seems however to have regarded the Boards as contributing to the fusing process. ‘The Board is not just a Board whose existence begins and ends with its formal and periodical meetings. It is a permanent organisation, controlling and directing the work of the personnel of the two countries so far as they are engaged in giving effect to the Board’s decisions.’ In fact the Boards did not work in this way; nor were they needed in such a role.

<sup>2</sup> For an account of the activities, and shortcomings of the Washington branch of the Combined Shipping Adjustment Board, written primarily from American sources, see S. McKee Rosen, *The Combined Boards of the Second World War* (Columbia University Press, New York 1951). For a British point of view, see C. B. A. Behrens, *op. cit.*, Ch. XX.

<sup>1</sup> John W. Frey and H. Chandler Ide, *op. cit.*, Appendix 7, Exhibit 2.

examine. Equally important, the Board took none of the operating decisions about tankers either. The tankers, in their respective 'fleets', remained subject to the final authority of the Ministry of War Transport, and the corresponding War Shipping Administration.<sup>1</sup>

In avoiding the 'combined machinery route' the British were choosing to build on foundations that were already firmly laid. The British and American governments had already been co-operating for some time in oil matters when their war partnership began at the end of 1941—in striking contrast to the situation prevailing between British and French in September 1939. The first of these contacts began as early as July 1940 when the Americans banned the export of aviation spirit and aviation lubricants from the United States to countries outside the western hemisphere. American intention was to deny them to the Japanese; but in taking this action they unwittingly upset British supply plans. Anxious representations from London led them to relax the ban in favour of Britain and the Empire. The misunderstanding led the Americans to suggest a visit by a prominent British oil personality. As a result in August 1940 the Chairman of the Petroleum Board, Sir Andrew Agnew, went to the United States. He gave the Americans a picture of British oil projects and problems; and also, at the British government's request, discussed the dollar payments problem with them. The contact thus established continued after Sir Andrew Agnew's departure; henceforward the Americans began to take British oil needs, particularly of aviation spirit, into account in planning their own production.

Another step forward came with the advent of lend-lease in March 1941. This made it necessary for the British government to set up an office in Washington to carry out the work of requisitioning and receiving lend-lease oil. On 16th May Mr. Piercy arrived in Washington with the title of British Petroleum Representative, to establish and operate a British Petroleum Mission there.

During the rest of 1941 the main function of the Petroleum Mission was to inaugurate the flow of lend-lease oil supplies; Mr. Piercy worked to extend lend-lease eligibility from Britain to other countries of the Commonwealth. Simultaneously negotiations for tanker assistance were carried out by the British Merchant Shipping Mission, set up under Sir Arthur Salter two months before the Petroleum Mission. The British Merchant Shipping Mission established particularly close and cordial relations with the American Petroleum

Co-ordinator and his deputy. It was, Sir Arthur Salter was to write later on, a 'great advantage that Ickes and Davies feel a personal responsibility for the maintenance of our stocks. They are personally *more* anxious to keep up our stocks than to save the United States motorist from rationing'.

This was the state of affairs on the eve of America's entry into the war. The weeks which followed were devoted to that 'development and adaption of existing liaison missions' which the War Cabinet had prescribed to fit the new conditions. At the beginning of 1942 the Petroleum Mission was merged with the British Merchant Shipping Mission. The British Petroleum Representative became deputy head of Mission under Sir Arthur Salter, and head of its 'Oil and Tanker Division'. Simultaneously the occasion was taken to make a change of personality. Mr. Piercy had no connection with the oil industry nor any special knowledge of its problems. In the spring of 1941 the Americans had thought it undesirable that the representative who would be handling lend-lease oil on behalf of the British government should have affiliations with an individual oil company. Now that they were in the war the Americans objected no longer; and there were obvious advantages in appointing a man who could talk on a technical plane. Accordingly, Mr. Harold Wilkinson, President of Shell's American marketing subsidiary, the Asiatic Petroleum Corporation, who had been acting as adviser to Mr. Piercy on tanker matters during 1941, replaced Mr. Piercy in the new dual post. Mr. Wilkinson held this appointment until the end of July 1945.

In the years which followed, the close working relations between the members of the British oil and tanker organisation in Washington, and American officials and agencies there, played a crucial part in the alliance. For instance, in July 1943 Mr. Wilkinson became a member of the American Foreign Petroleum Committee set up under Mr. Davies six months earlier, to keep an eye on production and refining by American oil companies in places outside the United States. The meetings of this body were to prove a convenient venue for the integration of British and American oil development plans. But it was in the eighteen months after Pearl Harbour that this kind of collaboration was most active and valuable; and nowhere was this more in evidence than in the allocation of tanker tonnage.

This was a task which fell into two main parts; the allocation of tonnage to trades or areas in line with supply requirements; and the allocation of individual vessels to trades or areas which they were best suited to by virtue of their size, speed etc. and regardless of the accidents of flag, ownership or charter.

Allocation of tonnage was a highly sensitive activity. It meant, in effect, distributing American tanker tonnage between the rival

<sup>1</sup> The War Shipping Administration was set up under Admiral Land on 7th February 1942 to put an end to the confusion arising from competitive requisitioning of ships by the two major American Services. Its tanker division controlled the operation of all American tankers except those actually owned by the American Services, or those which the War Shipping Administration had allotted to the United States Navy to operate on behalf of all Services. The Maritime Commission, also still under Admiral Land, remained responsible for shipbuilding.

claims of the American Armed Forces, the civilian supply programmes of the United States and other countries in the western hemisphere, and the British supply programme. Negotiations between Mr. Wilkinson and Mr. Ralph Davies, the American Deputy Petroleum Co-ordinator, and Mr. Brewster Jennings, the head of the tanker division of the American War Shipping Administration, were to lead to the transfer of far more American tankers to British service in 1942 than in 1941.

The distribution of individual vessels to appropriate employment was also carried out—so far as it was done at all in the absence of any impetus from the Combined Shipping Adjustment Board—through the same informal channels. Discussions on this subject began between the British Merchant Shipping Mission and the War Shipping Administration in March 1942. It was agreed that the slower tankers should be used on the shorter voyages and the faster, more modern ships, which consumed less fuel in proportion to cargo, on the longest ocean hauls; and that fast vessels should not, if possible be forced to waste their speed by travelling in convoy. The practical implications of this policy were that the newer faster vessels would work in the Pacific and that the oldest and slowest tankers would be allotted to western hemisphere civilian trades. It was agreed that there should be appropriate exchanges of individual vessels between the British and American-controlled tanker fleets; and the War Shipping Administration asked for a list of the British-controlled vessels as a preliminary to such exchanges.

Nothing of comparable importance to the working of the alliance took place in London. Even so, 1942 saw a considerable build-up of American representation there. In May, when signs of a major supply crisis were in the offing, Mr. Ickes, the American Petroleum Co-ordinator took up a suggestion of Sir Arthur Salter's the previous September to send his own representative to London. Mr. Ickes chose Mr. George S. Walden, Chairman of the Standard-Vacuum Oil Company, who joined the American Embassy as Petroleum Attaché. In June, the following month, Mr. Walden also took over the duties of the 'special naval observer' who, since September 1941, had been watching British tanker handling on behalf of the United States Navy Department and Maritime Commission. Mr. Walden also attended meetings of the British Oil Control Board and its sub-committees. But the American establishment in London remained on a far smaller scale than that of the British in Washington<sup>1</sup>. The Petroleum Attaché had a staff of only twelve. By contrast the British employed seventy-eight people in the United States to

<sup>1</sup> In October 1943 the Petroleum Attaché's Office was consolidated with other American missions in London to form a United States Mission for Economic Affairs. John W. Frey and H. Chandler Ide, *op. cit.*, p. 22.

handle oil affairs: sixty-seven in the Office of the British Petroleum Representative in Washington, and eleven in New York where the Mission had an outlying division handling the procurement of oil company materials. These figures exclude staff dealing with tankers who were located in the British Merchant Shipping Mission.

The disparity between British and American staff figures in Washington and London respectively, demonstrates clearly where the mainspring of the alliance lay. In so far as the Americans in London played any part in allocation decisions, they did so in a supporting and secondary role. Their main function was to keep the United States government informed about how the British were handling the resources the Americans had put into their hands.

(ii)

### Regional Co-operation

Beneath this machinery for policy co-ordination the two Allies made a series of *ad hoc* arrangements in the course of 1942 to co-operate at operating level. In each area or 'theatre', 'sterling' and American oil companies pooled their distribution facilities and worked together. The supply programme for the area was drawn up and executed either by Shell-Mex House or, in the case of war theatres within Washington's supply orbit, by the Army-Navy Petroleum Board; this was a joint supply agency set up in July 1942 by the two American Services to handle their oil requirements overseas.

The gap left by the absence of a combined oil authority should be noted. There was no single agency which was able to see the task of world-wide oil supply as a whole; or to draw up an integrated programme for the operations of 'sterling' and 'dollar' oilfields and refineries. Production and refining in the United States was organised by industry committees under the control of the Petroleum Administration for War; overseas operations of American companies were organised under the Foreign Operations Committee set up in December 1941 and also working under the control of the Petroleum Administration for War. The working of the sterling oilfields and refineries was controlled from London.

However, in parts of the world where sterling and dollar resources existed side by side there was an obvious need for local co-ordination to get the utmost out of the refineries. One such area, the East Indies, had been lost; but others were the Persian Gulf and the



Caribbean. In the Persian Gulf, the problem was not one of raising production, but of sharing out limited outlets. Until the summer of 1942 there was no co-operation over this. The small Caltex refinery on Bahrain simply produced as much as it could and left all the cuts to be taken by Abadan which was further away by sea from all importing countries. The Anglo-Iranian Oil Company of course disliked this arrangement, and there was a dispute between the companies in 1942, in which each invoked the support of its government. Eventually it was agreed that Bahrain should hold back its output to the average level of the previous three years.

In the Caribbean region the situation was more complex. Here dollar and sterling oil companies, including the Standard Oil Company (New Jersey) and Shell, operated oilfields on the South American mainland in Venezuela and Colombia, and refined most of the output from these fields on the Dutch West Indian islands of Aruba and Curaçao. The crude oil was ferried from Venezuela to these refineries in a fleet of shallow-draught tankers, and the refinery products were exported to Britain and other markets of the world. Apart from these sources on Dutch territory, two British oil companies, Trinidad Leaseholds Ltd. and Shell, operated oilfields and refineries on Trinidad side by side with smaller British crude oil-producing companies. Refining policy in 1942 was to produce a maximum quantity of white products, and to keep the combined output of fuel oil from exceeding market outlets. On two occasions, towards the end of 1942, and again in the spring of 1944, the Shell refinery on Curaçao was brought almost to a halt because all the storage space available had been filled with unwanted fuel oil.

In circumstances like this there was clearly an urgent need for co-ordinating machinery; for one thing the production policy required that refineries should only treat the lightest of the local crude oils, regardless of ownership connections. Late in July 1942 the Americans summoned representatives of all the refinery operators in the area to a meeting at the big Standard Oil Company (New Jersey) refinery on Aruba. At this meeting it was decided that all the companies with offices in New York should set up a committee there, as a sub-committee of the Foreign Operations Committee, to co-ordinate refinery operations. Later the scope of the sub-committee was widened to include oilfields as well. This Caribbean Area Petroleum Committee met for the first time on 9th December 1942, and set up separate sub-committees to deal with production and refining.

This American initiative in the Caribbean had been watched with mixed feelings in London. The need for regional co-operation could not be denied; but it looked as if the result of the new arrangements would be that the production policy of British companies in

the area would be determined in New York. London was not prepared to see this happen; it would widen the already wide disparity between the resources of the two nations and reduce still further Britain's already narrow range for independent manoeuvre. As a counter move it was decided to set up an equal and parallel committee in London, composed of representatives from all Caribbean oil companies with offices in London. This Caribbean Area Petroleum Committee (London) also held its first meeting towards the end of 1942. The next step was to get the Americans to acknowledge its authority. In January 1943 the whole question of co-operation in the Caribbean was raised during the visit of a British Ministerial mission to Washington. The British made their point and the twin committee system was formally adopted. It was laid down that if co-operative action between 'sterling' and 'dollar' companies was called for, the approval of both the London and New York committees would have to be obtained.

(iii)

### 100-Octane Spirit: A Special Problem

So far this chapter has described inter-Allied collaboration after Pearl Harbour both at the policy-making and operating levels. It has drawn attention to the essentially empirical approach of both partners and to the strong British preference for using informal contacts as the medium of policy-making. One part of the picture, however, stands out from this general pattern. Early in 1942 the Allies did in fact set up formal combined machinery to handle the distribution of 100-octane aviation spirit; and the British took a lead in pressing for this step because they saw that in this case their interest lay in the adoption of open and regular procedures.

The handling of 100-octane spirit in this exceptional way was a reflection of exceptional circumstances. First, this was a commodity which was produced in overwhelming proportion for the use of the Armed Forces; and secondly, at a time when all other products and even tanker space seemed in adequate supply, output fell so far short of demand that special treatment for it was accepted as natural and inevitable on both sides of the Atlantic. The shortage emerged quite suddenly in the autumn of 1941. It will be recalled that, before the war, the British government had made strenuous efforts to ensure

that there would be enough to meet Royal Air Force demands by 1941—when 100-octane spirit was due to come into general consumption. But after the outbreak of war the problem had fallen out of sight. The pre-war activity had been based on the assumption that United States supplies would be denied to Britain in time of war. In the event, as was shown, they remained available. At the same time production both in the United States and in other parts of the world developed more quickly than expected with the aid of a new and simpler process, developed by the Anglo-Iranian Oil Company, for the manufacture of iso-octane. This was the alkylation process in which butylenes and iso-butane are combined by means of a catalyst to form alkylates, a product rich in iso-octane. The importance of this development was that it eliminated the need for the large and costly hydrogenation plants required by the original polymerisation method<sup>1</sup> and made it possible to meet the vastly increased war requirements for iso-octanes.

Thus, although 100-octane spirit came into general use by the Royal Air Force earlier than the expected date of 1941—in fact during the Battle of Britain—there was no anxiety in these early months of the war about the prospects of supply. Later, however, the British recalculated their requirements. With their earlier strategic plans completely upset by German victories on the Continent the British decided to pin their hopes on building up a huge striking force of four-engined bombers. Their new calculations, taken in the light of a series of Air Force expansion programmes, showed demands far outstripping foreseeable sterling production. Only with the help of American supplies could the requirements be fulfilled.

The Americans were ready to do their best; ever since the autumn of 1940 they had been planning to expand their production and, after the visit of Sir Andrew Agnew,<sup>2</sup> they tried to keep British needs in mind. But they had been in no way prepared by London for the size of the demand the British put forward early in August 1941. They could have been hard pressed to meet it, even if this had been the only big new call on their resources. In fact, it was only one among many new demands. There were too the needs of the new ally, Russia, formulated at the Moscow Conference in September. There was a growing demand in Canada, where the Royal Air Force did much of its training. Both the American Army and Navy had big programmes of air training and expansion in hand. In the light of these demands, the best estimates suggested that Allied supplies would fall short of requirements by between eight and nine thousand

<sup>1</sup> See p. 56.

<sup>2</sup> See p. 254.

tons a day in 1942. Statistically, this deficit increased after Pearl Harbour, when the United States Services more than doubled their forecast requirements.<sup>1</sup>

Too much significance should not be read into these calculations. The main element in the deficit was the demands of the American Services, which were inflated—as the British Air Ministry had little difficulty in demonstrating. Soviet requirements were purely conjectural. As for the British demands, there were doubts even in government circles. Would Royal Air Force consumption of 100-octane spirit in 1942 really amount to ten times the 1941 consumption? The Minister of Aircraft Production, Lord Beaverbrook, was himself highly sceptical. Nevertheless the oil authorities in London were sufficiently perturbed to send a senior Petroleum Department official to Washington to press for an expansion of American production. And it seemed clear that, no matter what was done, the Allies were going to have to live with a shortage of 100-octane spirit for at least the duration of 1942.

It was against this background that the British in Washington took up the task of ensuring that adequate supplies of 100-octane spirit reached the Royal Air Force from American suppliers. They met stiff competition from the American Services in the early months of 1942. Here the 'informal approach' was no use; British contacts with United States civilian agencies could be little help in this particular battle. Accordingly, the British pressed strongly at all levels for the setting up of combined allocation machinery which, as Air Chief Marshal Sir Charles Portal put it, would enable that 'the limited amounts available should be distributed where they can do most good'.

The Americans accepted the need for this approach in principle. But progress was held up by a difficulty which was to cause a great deal of trouble in the months to come—namely the unwillingness of the American Service departments to co-operate with the American civilian agencies. It was clear that any allocating committee must contain representatives of both users and suppliers. But the American Services were unwilling, on security grounds, to allow the Petroleum Co-ordinator's office to learn the pattern of their needs. The obstacle was finally overcome by handing over the task of allocating 100-octane supplies produced at American refineries to the Washington branch of the Combined Munitions Assignments Board. This was virtually a Service body although it began life with a civilian chairman, Mr. Harry Hopkins. In Washington the Board worked through three standing committees which allocated naval, military

<sup>1</sup> See John W. Frey and H. Chandler Ide, *op. cit.*, Ch. XII. From 71,000 b/d to 150,000 b/d.

and air force supplies respectively; and it was through the third of these, the Munitions Assignments Committee (Air), that the allocation of aviation spirit was supervised.

The Munitions Assignments Committee (Air) itself appointed a specialised sub-committee, the Aviation Petroleum Products Allocation Committee (A.P.P.A.C.) to do the donkey work of allocation; this met for the first time on 4th March 1942. A.P.P.A.C., like its senior committees, was a predominantly Service body, chaired by a member of the United States Army Air Force, and with members from the United States Navy and Royal Air Force Delegation in Washington; however, its executive secretary was from the Aviation Division of the Petroleum Co-ordinator's office, which gave it house room. The British were, of course, represented at all levels in the machinery with Mr. Wilkinson or his deputy attending the meetings of A.P.P.A.C. and the Munitions Assignments Committee (Air).

A.P.P.A.C.'s brief was to allocate between the various claimants all aviation fuels designated as 'critical'—which from 1st July 1942 included all aviation fuel with a rating of 87-octane and above as well as 100-octane blending agents. It did this on the basis of production forecasts at meetings which took place every week throughout 1942. At the beginning of 1943 it set up an 'inner working committee' to deal with emergency requests. Henceforth A.P.P.A.C. met only monthly, on or about the 21st, to allocate supplies from the following month's expected output.<sup>1</sup> A.P.P.A.C. submitted its recommendations for confirmation first by the Munitions Assignments Committee (Air) and then by the Combined Munitions Assignments Board. The Combined Munitions Assignments Board's approval constituted authority for the civilian American petroleum agency to release the fuel from manufacturer's storage.

The setting up of a combined allocation committee to control the distribution of scarce aviation products was a logical step. But it left some questions still unsolved: for instance the disposal of a relatively small amount of 100-octane spirit manufactured at sterling refineries. This was controlled from London and therefore outside the purview of A.P.P.A.C. The Americans disliked this arrangement; in particular, from the spring of 1942, they urged that A.P.P.A.C. should allocate the output of the Curaçao and Trinidad 100-octane plants—all of which, for 'short-haul' reasons, was distributed within the American area of supply responsibility. There was much to be said for this proposal from a purely administrative angle. Nevertheless the British resisted it firmly. They were determined to

<sup>1</sup> It should be noted that A.P.P.A.C.'s assignments were based on estimates of production which were not always fulfilled. They were thus not always translated into awards.

maintain the principle—inherent in all Anglo-American procedures—that control of allocation should remain with the nation owning the resources concerned. To do otherwise would have been to place themselves even more at the mercy of their stronger partner. On the other hand if Britons were to have a voice—albeit a minority one—in the distribution of American aviation spirit it was only reasonable that Americans should be allowed their say in the disposal of sterling production. In September 1942 the Chairman of A.P.P.A.C. led a mission to London to discuss this question among others. The answer was found in the setting up of an Aviation Petroleum Products London Assignment Committee (A.P.P.L.A.C.) to allocate sterling production. This was chaired by the Air Ministry member and its secretary was from Shell-Mex House. It held its first meeting on 22nd October 1942.<sup>1</sup> Despite the setting up of A.P.P.L.A.C. the Americans still went on urging that control over sterling production in the Caribbean should be transferred to A.P.P.A.C. But the British never gave way on this point.

This question of control over sterling output was not so much an administrative problem as a problem of inter-Allied relations. But there were genuinely administrative difficulties to be overcome before the Washington allocation machinery could run smoothly. First among these was that of ensuring that instructions were complied with by the American Services. In a directive of 12th June 1942 the Combined Chiefs of Staff expressly ordered that all American manufacturers and suppliers of 'critical' aviation products should release supplies only as guided by the directives of the Munitions Assignments Board, through its sub-committee A.P.P.A.C. In practice, however, the American Services continued to take what they wanted under long-term contracts previously entered into with the refiners. Indeed, they were able to take even more than they had contracted for by invoking a clause in the Combined Chiefs directive which permitted suppliers in 'exceptional circumstances' to meet emergency demands presented to them by an accredited representative of the Armed Forces. In August 1942 the Combined Munitions Assignments Board decided that the Secretaries of War and Navy should be asked to instruct their subordinates to adhere strictly to the allocation procedure. Yet that procedure was still being contravened more than twelve months later. The Combined Chiefs revised their earlier directive omitting the 'exceptional circumstances' clause. But as late as September 1943 A.P.P.A.C. felt it necessary to circulate all manufacturers calling their attention to the revised directive.

<sup>1</sup> Other members were from the Petroleum Department and the Ministry of Aircraft Production (responsible for United Kingdom 100-octane production). There were also representatives from the two American Services and the United States Petroleum Attaché.

Just as important as the establishment of effective control over the supply of aviation products was the task of bringing system and order into the procedures for putting forward demands. In the early weeks of A.P.P.A.C. these demands came in from the United States Army, the United States Navy and British war theatres as and when need arose, and A.P.P.A.C. met weekly to consider them. Under these conditions the committee found it difficult to discriminate effectively between the welter of competing claims. The British, who suffered most from this, pressed for the adoption of a system of indent and allocation by 'war theatre'. Events in the theatres themselves added weight to their argument. As American air units moved into British supply areas across Asia, Africa and the Middle East, they sought exclusive use of storage and other local distribution facilities. The result was waste and friction. To avoid this the British urgently 'fostered and fought for' the obliteration of national distinctions and the setting up of area aviation products committees on which all local users and suppliers were represented. They were able to carry the day, at least in regard to British theatres. A Middle East Aviation Fuel Committee began to meet in Cairo on 3rd April 1942. By May similar committees had been set up in India and West Africa. In June formal recognition was given to the system with the signature, in Washington, of a 'Common User Agreement' between the Royal Air Force and the United States Army Air Force. This gave the local committees full responsibility for formulating theatre requirements for aviation products and for receiving and distributing them within their theatres. Stocks, regardless of origin or ownership, were to be at the disposal of all users, and distribution facilities were to be pooled.

After the signature of this Agreement the network of Aviation Petroleum Co-ordinating Committees (A.P.C.C.'s) as they were called, spread more widely. In the autumn of 1942 an A.P.C.C. was set up in Britain. By the end of the year the whole of Africa and the Middle East was covered, and there was an A.P.C.C. in the Australasian area. There was not the same response in zones of American supply responsibility; nor perhaps the same need since there was little or no competitive requisitioning in those zones. In the spring of 1943 an A.P.C.C. was set up in Washington to cover the requirements, (mainly by the American Services) for high-octane fuel in the Caribbean and Latin America. Later, requirements in Canada were consolidated and presented through the Canadian Oil Controller. But no A.P.C.C. was set up in the Central Pacific (where the United States Navy was the only consumer); and in the United States itself the two American Services continued to hand in separate requisitions. The procedure was that the A.P.C.C.'s submitted their demands monthly to A.P.P.A.C. or, if in British areas to

A.P.P.L.A.C. Then A.P.P.L.A.C. met their needs on a 'short-haul' basis as far as possible from sterling output, requesting the balance for each area from A.P.P.A.C. through the British Mission in Washington.

The establishment of orderly requisitioning procedures helped the allocation machinery to work more systematically. But A.P.P.A.C. needed more than this if it was to discriminate effectively between different areas. It needed, in the first place, to know the circumstances of each area, for instance its distance from supply sources and the likelihood of enemy interference with its supplies. It also needed to know the relative strategic importance to be accorded to these areas. Only with information of this kind could A.P.P.A.C. pick out with any confidence those demands that should be met in full, and those which could safely be left to bear the brunt of any shortfall in output.

The A.P.C.C. monthly returns in fact gave some of the background A.P.P.A.C. needed to discriminate effectively. These statistics covered estimated requirements for four months ahead, details of stocks, and of the previous month's consumption—all of which provided some check on forecasts. But where there was no A.P.C.C. the American Services did not provide this information; at the end of January 1943 A.P.P.A.C. complained that 'in spite of repeated requests' it was still receiving only 'sporadic and incomplete' reports from 'the continental United States, Alaska, the Central Pacific theatre. . . .'

The question of what stocks *ought to be held* in each area was examined on the occasion of the A.P.P.A.C. Chairman's visit to Britain in September 1942. A list of 'target stock levels' was drawn up; and these were broadly confirmed by an *ad hoc* committee set up in November by the Combined Munitions Assignments Board itself to investigate 'relative priorities of theatre requirements of aviation fuel'. Its recommendations were endorsed by the Board and finally incorporated, with some modifications, into a Combined Chiefs of Staff directive of 3rd April 1943. The target stocks were expressed in terms of months of forward consumption and it was stated that they should be recalculated monthly and checked against past experience.

Finally, A.P.P.A.C. pressed hard for guidance on strategic priorities between areas. In March 1942 a Combined Chiefs of Staff directive had divided the consuming areas into three broad priority classes. This was not detailed enough for A.P.P.A.C. Early in September 1942 it complained of its lack of familiarity 'with the strategy which must dictate the distribution of critical aviation fuel to meet forward requirements'; again in October A.P.P.A.C. stressed its need for strategic guidance if it was to discriminate

between demands effectively. Here, however, A.P.P.A.C. came up against the security-mindedness of the American Services who were unwilling to disclose information of this kind to a body on which a civilian body—the Office of Petroleum Co-ordinator—was represented. The Combined Munitions Assignments Board, as a Service body, at first refused to endorse a request to the Chiefs of Staff to designate an order of theatre priorities. Later, in November 1942, the Board relented a little, agreeing to a suggestion that representatives of the Combined Planning Staff should be available for periodic consultation by A.P.P.A.C. The Combined Chiefs of Staff gave their approval in April 1943.

These were the administrative arrangements to meet a 100-octane fuel supply shortage. It is time to consider how the production task was tackled.

## CHAPTER XII

### 100-OCTANE SPIRIT

(i)

#### Demand and Supply

THE 100-octane supply shortage stimulated a world production drive which must be given pride of place in any appraisal of the petroleum industry's contribution to Allied victory in the Second World War.

An idea of the dimension of the supply problem can be obtained from the growth of demand by the United States Armed Forces, reflecting the increasingly ambitious aircraft production programmes of the Americans. In November 1940 the United States Joint Aeronautical Board estimated that, if America entered the war, the United States Army and Navy air forces between them would require roughly 1·7 million tons of 100-octane spirit a year by 1942, rising to 2·5 million tons in 1943. The day after Pearl Harbour the Secretary for War informed the Petroleum Co-ordinator that the figure would be 6 million tons a year by 1st July 1943. By October 1942 the Joint Aeronautical Board was working on the basis of an American requirement of the order of 12 million tons a year by the beginning of 1944. In addition to these American demands there were substantial British and Russian requirements. The Joint Aeronautical Board estimated that total demands on United States and British-controlled supply sources would be of the order of 16 million tons a year by January 1944. By March 1943 the Board was looking forward to an ultimate Allied requirement of between 21 and 22 million tons a year. Later, however, the Board decided that its formula for calculation had led it to over-estimate demand by about a fifth.

On top of this demand for increasing quantity there was also a demand for higher quality. The 100-octane spirit manufactured in the United States for the American Services differed from that used by the Royal Air Force in having an inferior rich mixture response; that is, its anti-knock characteristics were not as good when the engine was working at full power. It was obviously preferable, and

indeed essential after the 'Common User Agreement' in mid-1942,<sup>1</sup> that the two countries should use fuel of the same specification; the existence of two separate grades made storage and distribution more difficult and hindered the efforts of the Americans to integrate their refinery operations. The Americans were unwilling to make their specification as stringent as the British one, for this meant a considerable reduction in output, and they made a big effort to persuade the British to accept a lower rich mixture response. But the Air Ministry would not yield on a matter affecting the operational performance of its aircraft. The question was discussed in the visit of the Joint Aeronautical Board Mission to Britain in September 1942.<sup>2</sup> Eventually the Americans came round to the British way of thinking. A joint specification for 100-octane spirit was issued in January 1943, which demanded a rich mixture response even better than that of the existing British specification.<sup>3</sup> This new fuel, known as '130 grade' (100/130 from the autumn of 1943)<sup>4</sup> continued as the standard aircraft fuel used on operations until the end of the war.

Continually increasing requirements for a higher quality product than they had been accustomed to making was the challenge which confronted the Petroleum Administration for War and the American oil industry which worked under it. It was met in three ways. First, and most important, the Americans converted all their aviation spirit plants into what was virtually one big integrated productive unit. Each plant submitted a monthly blending programme to the Petroleum Administration for War indicating what quantities of the various constituents of 100-octane fuel—base spirit, alkylates, and other blending agents or additives—it would require to achieve maximum production, or which it would have surplus to requirements. The month's supply of components was then distributed among them, regardless of ownership, in the way judged best to achieve the biggest total output of finished fuel.

Secondly, the Americans built many new plants—and this despite the extreme shortage of steel in America, which meant that the Petroleum Administration for War had to secure authority from the War Production Board for each programme of expansion. These

<sup>1</sup> See p. 264.

<sup>2</sup> See p. 263.

<sup>3</sup> In the course of 1943 British and American specifications for lower grades of aviation fuel were also brought into line.

<sup>4</sup> Rich mixture rating, though still *measured* in terms of knock resistibility was *designated* according to a scale of 'Performance Numbers', worked out by the Americans, which indicated the comparative engine performance that a fuel with a given degree of resistance to knock would permit. On this scale the rich mixture performance of British specification 100-octane spirit was 125; and that of the joint specification fuel was 130. The Americans always hoped to be able to introduce a new 'Pursuit' fuel of 115/145 when productive capacity had at last got ahead of demand; but this never proved possible.

increases—to 8 million tons of productive capacity a year by March 1943, to 12 million by November 1943 and to 16 million by January 1945—were secured against strong opposition, especially from the manufacturers of synthetic rubber whose need for substances such as benzole could only be satisfied at the expense of 100-octane manufacture. In fighting his battles for more capacity the United States Petroleum Administrator for War received strong support, both moral and statistical, from the British—on one occasion, at least, from the Prime Minister himself.

Thirdly, the Americans raised their production by the use of new blending agents and additives, or old ones like tetraethyl lead in greater concentration.<sup>1</sup> The main contribution came from the use of aromatic hydrocarbons. Not only were these able to eke out the supply of alkylates which was one of the limiting factors on production, but their anti-knock characteristics were superior under rich mixture conditions. The most effective aromatic developed was in a substance called cumene which was made by alkylating the aromatic hydrocarbon, benzene, with propylene. Developed in Shell's American laboratories cumene began to be produced in May 1942. Because of its high boiling point the amount that could be put into aviation fuel was limited to 10 per cent. Even so it was reckoned that some 23 per cent. of the increase in 100-octane spirit production in the United States down to the end of 1943 could be attributed to the use of this new component.<sup>2</sup> From about 2½ million tons at the beginning of 1942 the rate of 100-octane spirit production in the United States rose to some 7 million tons a year by the middle of 1943; it more than doubled again over the next twelve months to reach 16 million tons by the middle of 1944; by the beginning of 1945 it had risen to more than 20 million tons a year.<sup>3</sup>

It may be of interest to record that the gas and coke oven industries in Britain made a modest contribution to this production drive. Benzene, the main constituent of cumene, is in fact the chief chemical constituent of coal tar benzole. During the middle years of the war the Americans, who needed benzole for making synthetic rubber as well as aviation spirit, pressed their Allies for supplies. They received Australia's total exportable surplus of some 12,000 tons a year, and, from the autumn of 1942 all Britain's surplus as well. Under this pressure from the Americans the Government did its best to raise benzole output. Already, the previous autumn, the Government had abandoned the reliance on persuasion associated

<sup>1</sup> The British specification had allowed 4 c.cs. of lead per Imperial gallon at the outbreak of war, raised to 4.8 c.cs. in late 1941. It was raised to 5.5 c.cs. in September 1943.

<sup>2</sup> John W. Frey and H. Chandler Ide, *op. cit.*, Ch. XII.

<sup>3</sup> John W. Frey and H. Chandler Ide, *op. cit.*, Table 39.

with the Evetts Committee<sup>1</sup> and had published Orders compelling all gas producers with benzole recovery plants to scrub their gas for benzole.<sup>2</sup> In 1942 many gas undertakings were given permission to reduce the calorific value of their gas below the statutory limit. Not all of them could do so because this involved increasing the volume of gas put through the mains, which was not always possible. Nevertheless by 1943 the output of 90 per cent. of the coal being carbonised in Britain was being treated for maximum benzole recovery, and the amount of crude benzole recovered at gasworks was 85 per cent. greater than in 1940. Output declined later in the war as the loss of younger workers caused standards of work and maintenance to fall off, especially where plants were overdue for renewal. Meanwhile more of what was produced was diverted from the United States into the 100-octane spirit production drive that was under way at 'sterling' refineries.

That production effort will now be described. Its importance in quantitative terms was marginal. Total output at all Allied plants outside the United States (and the Soviet Union) never exceeded 3 million tons a year.<sup>3</sup> Nevertheless these outlying points of production held a special importance because of their relative proximity to main areas of consumption. The special efforts made to develop them justifies their more detailed treatment in these pages.

## (ii)

## Persian Gulf Production

Of the three areas outside the United States with 100-octane spirit producing capacity it was the Persian Gulf whose location attracted most attention after Pearl Harbour. With the loss of the Dutch East Indies, the refinery at Abadan was the only source of 100-octane spirit east of Suez; demands throughout the Middle East, East Africa and the Indian theatre, which could not be met from Abadan would have to be supplied from the Gulf of Mexico—a sea journey as long as that from London to Singapore.

<sup>1</sup> See p. 174.

<sup>2</sup> Public Utility Undertakings, General Direction under Regulations 55 and 56 (S.R. & O. 1941 No. 1714) and Benzole Recovery Plant Order, 1941 (S.R. & O. 1941 No. 1715). The Orders were published under pressure from the Ministry of Supply which needed more toluene (another benzole constituent) for the manufacture of explosives.

<sup>3</sup> See John W. Frey and H. Chandler Ide, *op. cit.*, Table 39.

The existence of Abadan's productive capacity for 100-octane spirit was a tribute to the initiative and inventiveness of the Anglo-Iranian Oil Company. The role they played in the development of the process for manufacturing 'iso-octane' by alkylation has already been mentioned.<sup>1</sup> They combined their alkylates with an 'aromatic extract' produced from Iranian crude oil by means of the solvent refining technique. By the outbreak of war the company, without any incentive in the form of a 'guaranteed offtake', was in a position to make 75,000 tons a year of 100-octane spirit from a crude oil once regarded as being totally unsuitable for making high-grade aviation spirit. By the middle of 1941 productive capacity at Abadan had risen to 175,000 tons a year. Actual production in 1940 was 23,000 tons, and in 1941, 67,000 tons.

It was in the late summer of 1941 that the British government began to take an active interest in this new source of supply. The Moscow Conference of September had been preceded by a meeting between the British and the American delegations at which the Minister of Aircraft Production, Lord Beaverbrook, suggested that Abadan's output be developed as a source of supply for the U.S.S.R. which would need 100-octane spirit to fuel the aircraft to be delivered from its Western Allies. This suggestion was approved in principle. Specifically, the intention was to increase production to half a million tons a year by the beginning of January 1943. The growing demand for aviation spirit east of Suez also helped to persuade the British Treasury to authorise an expenditure of \$5 million to buy equipment for this expansion from the United States. For their part the Americans gave the project their 'highest priority' rating.

With the loss of the East Indies the Allies became more dependent on production at Abadan. In January 1942 the Oil Control Board gave its approval to a plan for a second expansion which would raise Abadan's 100-octane spirit production capacity to 750,000 tons a year. By this time supplies of American equipment had become very much harder to get under the impact of the huge American refining expansion programme. The British urged that expansion of Abadan's 100-octane output should be given preference over expansion within the United States itself. This view seems to have been accepted by the Americans, who later gave a higher priority rating to both the first and second Abadan expansion schemes.

Nevertheless, despite the auspicious beginning, the Abadan expansion plans ran into difficulties and fell behind schedule. The first problem was labour. Indian workers, who were well-suited to the climate were recruited after initial delays due to the high standards required. But American technicians were also needed; and these

<sup>1</sup> See p. 260.

were reluctant to travel by unescorted freighter to the Persian Gulf despite every effort by the oil company and the contracting firm, M. K. Kellogg Company, to persuade them to do so. Air passages proved difficult to procure (they were in fact obtained only after appeal to the Combined Chiefs of Staff). As a result it was June 1942 before the Americans had arrived in sufficient numbers to carry on the work at the scheduled rate. Then came a serious set-back; the sinking, with 'disproportionately heavy losses' of four ships carrying part of the plant and materials to the Persian Gulf. This meant that priority ratings needed to secure replacements for this material had to be fought for again against the fierce competition of the United States refineries. Moreover this competition took place at a time when the American authorities were beginning to have doubts about the future of Abadan, now threatened by the German advance into the Caucasus; and to ask whether the building of a 210,000 tons a year 100-octane plant at the Caltex refinery on Bahrain would not be a safer bet. In any case there was a considerable reluctance to expose more precious equipment to the hazards of the long sea voyage; in the event, all shipments were suspended throughout the late summer and autumn of 1942.

The British did not share these American doubts about the future of Abadan. They argued that the Abadan extensions would give greater output than the Bahrain scheme, and give it more quickly. Indeed, by the autumn of 1942, the British were already considering a third scheme of expansion to raise Abadan's 100-octane spirit capacity by another 200,000 tons a year by the autumn of 1944; this scheme also included the provision of a new distillation unit to increase Abadan's general capacity to produce white oil products.

By the beginning of September 1942, after taking the 'matter to the very highest levels' Mr. Wilkinson was able to win the highest American priority rating for the replacements of the equipment that had been sunk; and appropriate priorities for the balance required for the first two extensions. But American approval of the third extension was not gained until March 1943 when the German threat to Iran was safely past; in fairness it should be said that the American authorities took even longer (to be precise until May 1943) to endorse the Caltex scheme for Bahrain.

Towards the end of 1943 the British worked out the details of a fourth extension to Abadan. This never materialised because it could not have been completed in time to be of use. The cost of the schemes actually carried out was shared equally between the Government and the company. The cost of the equipment provided by the Americans came to \$17 million, all of which Britain paid out of her reserves.

(iii)

### United Kingdom Production

Increasing 100-octane production in the Persian Gulf promised a big saving in tanker requirements; increasing it in Britain, on the other hand, laid a small extra burden on tankers because of the effect of 'refinery loss'. Nevertheless a drive for maximum production was launched in this country in the spring of 1942, just at the time when the operations of all other United Kingdom plants processing imported oil were being cut down to a minimum. At that time, and for the rest of the war, the need to raise 100-octane spirit production took priority over the saving of tanker space in the minds of the authorities.

What in fact was the capacity available to produce 100-octane spirit in this country on the morrow of Pearl Harbour? The largest supplier on the eve of the war had been the hydrogenation plant of Imperial Chemical Industries Ltd. at Billingham where, on the recommendation of the pre-war Hartley Committee,<sup>1</sup> a small pilot plant to manufacture iso-octane had been added to the main petrol-producing plant. Billingham manufactured some 30,000 tons of iso-octane in 1939; but in 1940 and 1941 its capacity was used to produce motor spirit as an import-saving measure. In addition to Billingham there was also the plant that Shell, under the stimulus of the contract offered by the Government, had built at Stanlow to manufacture 32,000 tons of iso-octane a year by hydrogenating octylenes imported from Curaçao. There was also a much larger Government-owned plant at Heysham, built on the recommendation of the Hartley Committee on high octane fuel, which had come into operation in August 1941. A fourth and even larger plant, located at Thornton, not far from Stanlow, lay half-built and abandoned.

The story of Thornton is worth recording. It is an example of second thoughts leading to delay, delay to indecision and indecision to final futility. It will be recalled that in December 1938 the Hartley Committee had recommended the construction at Government expense of three hydrogenation plants, one in Britain and two in Trinidad to manufacture 720,000 tons of 100-octane spirit a year from Trinidad gas oil. The Government had accepted this scheme in February 1939 and modified it the following July. To save money the Government decided to build two plants instead of three, and to

<sup>1</sup> See p. 56.



build both of them in this country on the grounds that suitable labour and technical staff would be easier to procure here. Later the Government changed its mind again, accepting an offer by Shell to build the second of the two plants at its own expense, but to its own design, with the aid of a Government loan; in time of peace the company intended to use this plant to make ordinary motor spirit. This was clearly a much better economic proposition from the Government's point of view and technically it was more advanced than the Heysham project, but the consequence of this further change was that work on the second plant, Thornton, did not start before war broke out.

The fruits of delay were then garnered. Pressure on labour and materials hampered all construction projects in Britain during 1940 and work at both the Heysham and Thornton sites fell increasingly behind schedule. In June 1940 it was decided to concentrate on completing the more nearly-built Heysham plant. Meanwhile the Air Ministry had handed its responsibility for the projects over to the newly-formed Ministry of Aircraft Production. The Minister, Lord Beaverbrook, bore it unwillingly in the hectic months which followed the fall of France. He argued that the plants would be finished too late to affect the immediate issue and that, in the long run, they would not be needed owing to the growth of American productive capacity. In November 1940, Lord Beaverbrook suggested to the War Cabinet that work at Thornton should be abandoned. His views were strongly opposed by the Air Ministry which argued that it would be unwise to rely entirely on the United States, partly because of the growing dollar shortage, but mainly because it was uncertain how big America's own demand for 100-octane spirit would have become—and, therefore, how much she would have to spare for Britain—by 1942. Sir Andrew Agnew took the same view and the Oil Control Board strongly recommended that work on the plant should continue. The matter was taken to the War Cabinet which acquiesced in the Oil Control Board's view.

Thus Thornton was reprieved; but not for long. In April 1941 Lord Beaverbrook launched a new attack on the whole Hartley policy. This time circumstances favoured his position. With the dollar problem on the point of solution the need to save tanker space was now predominant. April was the critical month when an Oil Control Board sub-committee reported in favour of ending all refining of imported oil in Britain except what was needed to produce bitumen.<sup>1</sup> It was calculated that 100,000 tons of imports could be saved during 1941 by not bringing Heysham into use. But Heysham was nearly finished, and the Air Ministry was able to insist that it

should be carried through to completion. However, the Ministry found it hard to justify the continued expenditure of materials and labour on Thornton. For one thing, because of the process chosen by Shell, the element of 'refinery loss' threatened to be twice as great as at Heysham.<sup>1</sup> Moreover, work at Thornton was so far behind schedule that it was not expected to come into operation before the middle of 1943. Accordingly on 21st April the War Cabinet decreed that Thornton should be abandoned.

This decision, once made, was irrevocable; later events suggest that it was also premature. The War Cabinet acted under a misapprehension: the belief that the United States would be able to meet all British requirements of 100-octane spirit during 1942 and 1943. The War Cabinet had insisted on securing an American assurance to this effect before making up its mind. Four months later, in August 1941, it became apparent that the American assurance was worth very little. For this the Air Ministry, not the Americans, were to blame. In the spring of 1941 the Ministry had estimated the supplementary needs of the Royal Air Force for American 100-octane spirit at 150,000 tons during 1942 and 400,000 tons during 1943. A few months later, on 4th August, they asked the startled Americans for 1,150,000 tons in 1942 and 1,600,000 tons in 1943.

This huge and sudden rise in demand was a consequence of policy vacillation within the Air Ministry. Behind this lay an unhappy story. Towards the end of 1940 the Air Ministry had decided to use 90-octane petrol in place of 100-octane in those of its operational aircraft—and they were still the vast majority—that could fly equally well on the lower grade fuel. They did so in order to save dollars—90-octane fuel could all be obtained from sterling sources. At a time when lend-lease was still in the future and Departments were being pressed to make savings this was not a negligible factor. But there was also another consideration: a drastic reduction in the estimated output of Heysham. It will be recalled that the pre-war Hartley Committee had based its calculations on the assumption that tetraethyl lead could be used in a concentration of 7 c.cs. to the gallon. This assumption proved far too optimistic. It was not until November 1941 that it was technically possible to relax the specification to permit the concentration to be raised from 4 c.cs. to 4.8 c.cs. It was not until 1944 that 7 c.cs. was able to be tolerated. Largely, it would seem, because of human frailty, this unfortunate

<sup>1</sup> Heysham was expected to require about 450,000 tons of gas oil feedstock a year to produce 350,000 tons of products. Thornton, distilling 800,000 tons of crude oil a year, could have produced about 400,000 tons of petrol with the aid of the recently developed catalytic cracking process, a by-product of which, however, would have been about 200,000 tons a year of petroleum coke. Catalytic cracking produced a more stable spirit than the old thermal cracking process, so that it was possible to use it in aviation fuel.

<sup>1</sup> See p. 192.

state of affairs was not made known in responsible quarters until late in September 1940; and by then it was far too late to change the design of the new 100-octane plants. It had to be accepted that neither Heysham nor Thornton would be able to produce enough iso-octane to give all their output a 100-octane rating. The best that could be done was to convert what would be a very considerable surplus of 'base' spirit into 90-octane spirit. The decision to use 90-octane petrol as an operational fuel wherever possible had been, in part at least, an attempt to retrieve the mistake, and to permit Heysham to contribute its full planned quota of 'operational' fuel.

Unfortunately the decision could not be maintained. It was unpopular with the Royal Air Force, where the introduction of a second grade of operational fuel made the work of distribution more complex. The decision was rescinded when technical obstacles to the use of 90-octane spirit became apparent in the summer of 1941.

The decisions first to accept, and then to reject, 90-octane petrol as an operational grade were the cause of the huge fluctuation in the size of the British demand for 100-octane fuel. It was the factor which made nonsense of the attempts of the American authorities to plan their production with British needs in mind. It led to the abandonment of the Thornton plant only a few months before maximum production of 100-octane spirit became a first priority of British oil policy.

Thus at the start of 1942 100-octane spirit production capacity in Britain fell far short of pre-war expectations; and the limiting factor on production was the amount of iso-octane available. Even the combined output from Stanlow and Billingham was not enough to match Heysham's surplus of 'base' petrol. The gap became even wider when it was found that Billingham 'base' petrol could be produced, with the aid of a new catalyst, to a higher octane rating than Heysham 'base'. From May 1942 this plant, discounted before the war because of its location on the east coast, was switched to make 100-octane spirit instead of motor spirit. As for Heysham 'base', its rating was improved by mixing it with benzole. Later better results were obtained by mixing the benzole with the gas oil feedstock and hydrogenating the mixture. This 'hydrobenzolisng', as it was called, began at the start of 1943.

These changes, by improving the blending ratio, lessened the imbalance in United Kingdom production of iso-octane and 'base' spirit. Nevertheless home-produced iso-octane still had to be supplemented by imported supplies. These could only come from the United States (which was already supplying the gas oil feedstock for Heysham). Throughout the winter of 1941-42 the British had pressed the Americans to make up Heysham's deficiency of iso-octane. But they could get no long-term supply commitment

since, as already explained, American iso-octane supplies were distributed between all the various plants on a month-by-month basis. The most the Americans would concede was that the United Kingdom plants should compete for allocations on equal footing with their own plants.

This was logical enough and the British accepted it. From October 1942, a United Kingdom blending programme for three months ahead, together with a report on the previous month's blending and output, was passed to Washington each month to be considered in conjunction with similar programmes submitted by United States refineries. Iso-octane was allocated to Britain through the Aviation Petroleum Products Allocation Committee. Apart from a short period at the end of 1943 when the United Kingdom forward production programme fell under a strict security ban, this flow of information continued to the end of the war. It seems doubtful whether the labour was commensurate with the results. In the whole three years 1942-44 United Kingdom imports of American aviation components amounted to less than 80,000 tons.

(iv)

## Caribbean Production

The case for building up 100-octane spirit production in the Persian Gulf and in the United Kingdom did not become strong until after the middle of 1941. In the Caribbean there had been thought to be a strong case even in the pre-war years. The British colony of Trinidad, out of reach of German bombing and yet closer to this country than any other sterling supply source, was a favoured location. The offer of a Government contract had prompted Trinidad Leaseholds Ltd. to build a plant to supply 17,000 tons of iso-octane a year, and this plant was in full operation by 1941. Trinidad had also figured largely in the scheme of the Hartley Committee.<sup>1</sup> Shortly after the outbreak of war the Government decided to pay for the construction of yet another 100-octane spirit plant at the site of the Trinidad Leaseholds' refinery. This plant reached its full rate of output of 100,000 tons a year in 1942.

In 1940 the United Kingdom received roughly one-third of its imports of aviation spirit from Caribbean refineries. But in 1941, when the supplies from United States became available without

<sup>1</sup> See p. 56.

dollar payments, the Caribbean plants began to lose their advantages as a source of supply for Britain. At the same time, however, they became more valuable to the Americans themselves. American oil demands in that part of the world grew after the United States acquired bases in the British West Indies in 1941; and, for 'short-haul' reasons, the Americans met these demands as far as possible from local sources, including sterling plants in the western hemisphere. After Pearl Harbour, the Caribbean aviation spirit refineries also became the primary source of supply for airfields in Brazil, Nigeria and the Gold Coast which were used as staging points for aircraft being ferried in increasing numbers to the Middle and Far East. Later, the loss of the Dutch East Indies also made it necessary to supply South Africa from the West Indies, since aviation spirit production at Abadan was not enough even to meet needs east of Suez. Because of these growing 'short-haul' outlets the Americans decided, in 1942, to double the production of 100-octane spirit at the Standard Oil Company (New Jersey) refinery at Lago, on Aruba, as part of their own expansion programme. The Americans built two alkylation plants, and a catalytic cracking plant to bring up the Aruba refinery's 100-octane output capacity to about 550,000 tons a year. These extensions were completed and in operation by the spring of 1944.<sup>1</sup>

The American decision to expand at Aruba reduced the need to do so at the sterling plants. After completion of the British government's 100-octane plant in Trinidad there was no further addition to the Trinidad Leaseholds Company's refinery. At Curaçao, however, other motives came into play. There was the desire of Shell to make use of equipment collected for the abortive Thornton project, and the Government's reluctance to see this project written off as a total loss. As early as July 1941—that is, even before the existence of a world-wide shortage of 100-octane spirit had been disclosed—Shell was urging that the alkylation plant designed for Thornton should be transferred to Curaçao. In September 1941 the Government had given its approval. After Pearl Harbour, there was a stronger case for expanding production of white oil products in the area. It was then suggested that the partly-erected distillation and cracking units on site at Thornton should also be moved to Curaçao. This meant the provision of labour to dismantle the plant in the United Kingdom, as well as allocation of shipping space to carry it to Curaçao. The proposal was therefore referred to the Oil Control Board. The Board approved it at the end of April 1942. Shell also—understandably in view of its part in cumene development—asked for approval to erect a cumene plant at Curaçao. This

<sup>1</sup> John W. Frey and H. Chandler Ide, *op. cit.*, p. 267.

the Government agreed to in August 1942. The intention was to supply this plant with benzole from Britain at a rate of 40,000 tons a year.

These schemes carried lower priority than the projects for expansion at Abadan and took even longer to come to completion. However, local measures and technical innovations succeeded in wresting higher output from the existing plants; for example, by July 1943, the output capacity of the Government-owned Trinidad plant had been raised to 156,000 tons of 100-octane spirit a year. Production rose in 1942 partly because the plants, now operating to meet American needs, were manufacturing to the less stringent American specification. The effect on output of introducing the higher quality '130 grade' at the beginning of 1943 was partly offset, some months later, by the alteration of the combined specification to allow a concentration of 5 c.c.s. of tetraethyl lead per gallon. More important, however, was the growing co-ordination of oil company operations within the area. Already, by August 1942, full co-operation had been established between the sterling companies in the area; this was extended to the American companies through the new Caribbean Area Petroleum Committees.<sup>1</sup> These committees arranged and supervised the allocation of feedstocks and aviation components to the refineries in the interests of maximum output and without regard to ownership. To work out details, the companies set up a local combined technical group which visited all three 100-octane producing refineries during the first half of 1943. Subsequently light crude oils from American-owned oilfields in eastern Venezuela were sent to the Caribbean sterling plants in place of heavier sterling crudes; this improved their yield of aviation spirit and reduced their output of black oils. The Government-owned 100-octane plant on Trinidad, instead of running on Trinidad crude oil, received a charging stock of heavy naphtha from the Shell refinery in Trinidad; it also benefited from process oils shipped from the American refinery at Caripito in Venezuela.

Another boost to Caribbean production came from the transfer of a component called avaro, produced in surplus quantities at Curaçao, to both Trinidad and Aruba. Avaro was a highly aromatic extract developed at Curaçao in 1941: its high rich mixture response enabled the refineries to 'stretch out' their supply of 'alkylates'. The use of avaro doubled Curaçao's 100-octane output over the first half of 1942. Unfortunately, owing to its low volatility, avaro could only be employed in conjunction with high volatility isoparaffins such as iso-pentane and iso-hexane; and the supply of these was limited.

<sup>1</sup> See Chapter XI, Section (ii).

(v)

### Division of Supplies

Despite all the efforts to raise production, both within the United States and outside it, the gap between demand for 100-octane spirit and the supply of it, so far from narrowing, grew wider during the eighteen months that followed Pearl Harbour. In October 1943 the deficit estimated on a daily basis was twice as great as in November of the previous year.

This growing pressure on supplies led to open disagreement between British and American representatives on the committees set up to allocate 'critical' aviation products. The first signs of strain appeared late in 1942 when the Aviation Petroleum Products Allocation Committee began to impose severe cuts—amounting in October to as much as 75 per cent.—on British requisitions for the United Kingdom. This policy of restriction coincided with growing demands by the United States Army Air Force in Britain, and withdrawals from the United Kingdom's domestic stocks to supply the landings in North Africa. As a result aviation stocks in Britain stopped rising; indeed they began to fall—for the very first time in the war. There was considerable alarm in London about this. The Air Ministry criticised A.P.P.A.C.'s allocations as 'unreasonably low'. The British sought to persuade the Americans that United Kingdom oil requirements merited special treatment not only because of the country's exceptionally exposed position, but also because of Britain's important role as the 'heart of the whole resistance to the enemy', as the Prime Minister put it in December 1942. Specifically, British representatives argued that the attainment of United Kingdom stock target levels should be given priority over the claims of all other war theatres.

At first they were able to carry the Americans a long way with them. Both the Joint Aeronautical Board Mission, which came to this country in September 1942, and the special committee appointed by the Munitions Assignments Board to make recommendations on theatre stock levels,<sup>1</sup> acknowledged that there were war theatres which called for special treatment. The Joint Aeronautical Board Mission asked that a relative order of priority should be issued and the special committee, for its part, while recommending that the shortage be distributed evenly, implied that 'important strategic considerations' could be regarded as justifying an exception to this principle. The Munitions Assignments Board found no fault with

<sup>1</sup> See p. 265.

this recommendation. But the Combined Chiefs of Staff, when they came to consider the findings of the Board in the spring of 1943, decisively rejected the whole conception of long-term priorities for particular theatres. In their directive of 3rd April they left out the clauses which had implicitly admitted the United Kingdom case for special treatment and affirmed forthrightly that 'such priorities should only be resorted to when conditions become acute, and then must be judged on the existing strategical situation'. A.P.P.A.C. would keep in touch with that 'strategic situation' through representatives of the Combined Staff Planners.

The British had been hoping to secure a long-term guarantee which would have virtually insulated United Kingdom aviation spirit stocks from the effects of world-wide shortage. Their failure to do so was the preliminary to a severe Anglo-American struggle within the allocation machinery during the summer of 1943. The struggle was preceded by further big cuts in allocations to the United Kingdom. The effect of these cuts was increased by the priority then being given to shipments for North Africa, where the final battles were in progress. United Kingdom stocks of 100-octane spirit which had recovered since the previous year, began to fall once more.

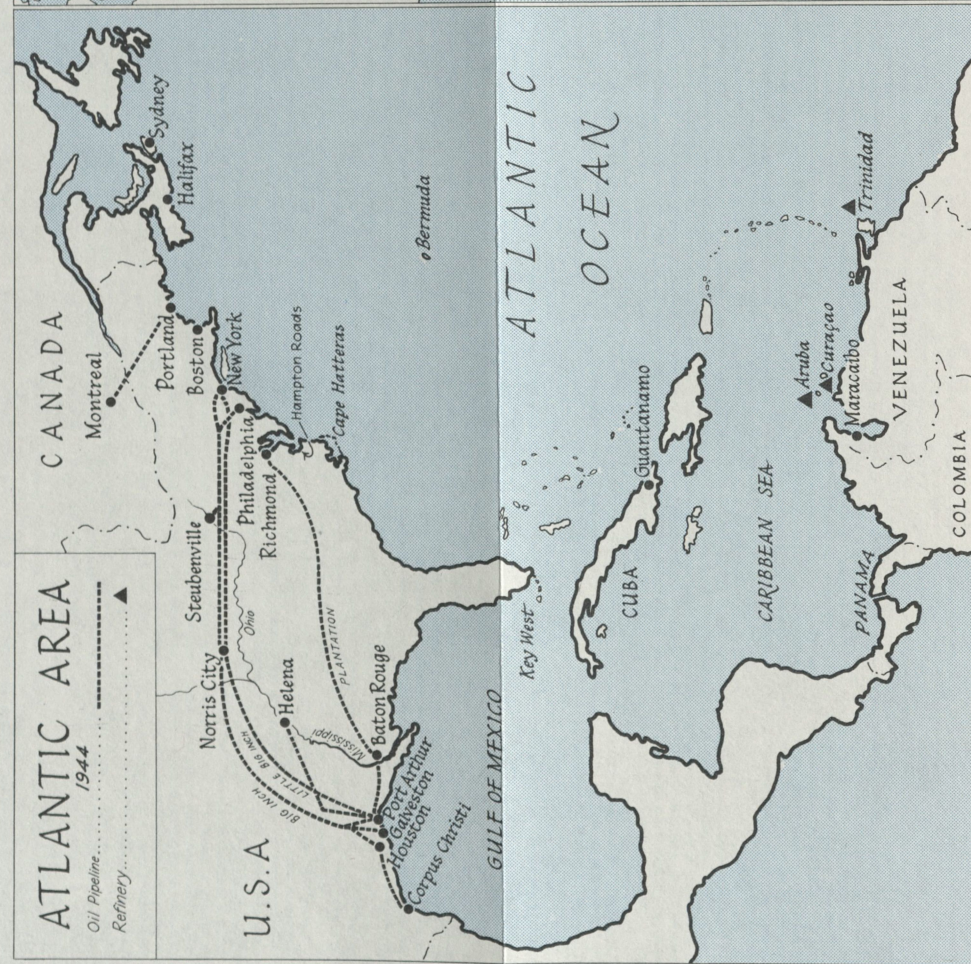
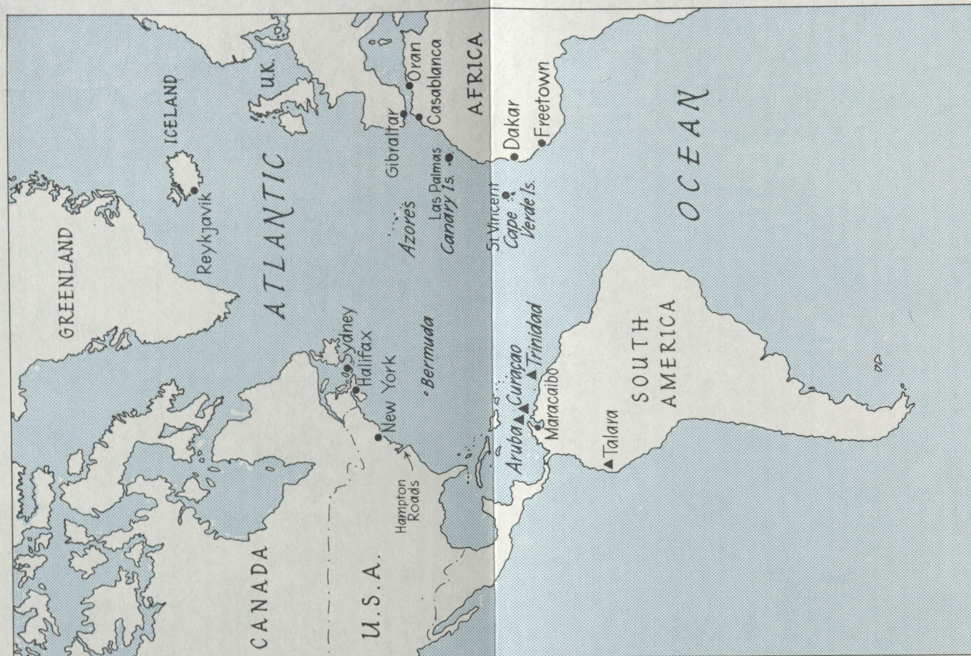
The cause of the trouble at this time was a big rise in the level of demand for 100-octane spirit within the United States itself in consequence of an expansion in the American air training programme. On this occasion the British members of A.P.P.A.C. based their position on the case for giving priority to operational needs. They argued that it was wrong to divert supplies of operational fuel away from operational areas; and suggested that, after current needs for operational consumption in all parts of the world had been met, priority should be given to building up theatre stocks to authorised target levels. This was the policy, they pointed out, which the Combined Staff Planners had recommended in April.

The American armed forces took a different view. They regarded the whole policy of building up stocks to approved target levels in the various theatres as simply a counsel of perfection. On the specific issue dividing the two sides the Americans stated, in a forthright memorandum, that they believed it 'poor management to build stock piles to what is normally deemed desirable and forego training flying in this country'. There was no point, they said, in stocking up aviation fuel if there were insufficient trained aircrews to raise consumption to the level the stocks being accumulated were supposed to give backing for. This was a cogent argument as far as it went. But it did not carry conviction to the British. Behind British reasoning lay a strong suspicion that 100-octane spirit was being wastefully handled within the United States. They also believed that American

demands did not make full allowance for the effect of economy measures already agreed upon.

The issue was one of principle which could not be settled within A.P.P.A.C. itself and was referred upward through the hierarchy of Anglo-American decision making. The Munitions Assignments Committee (Air) and the Combined Munitions Assignments Board itself did not find it possible, or desirable, to pronounce on the relative importance of consumption for immediate training on the one hand and stock-building for future operations on the other. In practice the claims of both cases were investigated. In July 1943 a conference of Royal Air Force and United States Air Force Chiefs examined the effectiveness of various 100-octane spirit economy measures taken at United States domestic stations. In August a special committee, set up by A.P.P.A.C., proposed that stock target levels should be reduced and that 'minimum levels'—that is, levels below which it would be dangerous to allow stocks to fall—should be established for each war theatre. Meanwhile neither side pressed its point to the limit in the actual division of supplies. British requisitions for the United Kingdom ceased to aim at restoring stocks to target level with a single allocation. Requests were based instead on a policy of gradual build-up. For their part the American majority in A.P.P.A.C recommended allocations for the United Kingdom which were just enough to meet forecast consumption; after the dissent of the British the Munitions Assignments Committee (Air) would increase the allotment to provide for a small increment to United Kingdom stocks. By the beginning of September 1943 British anxieties had been laid to rest.

Thus the first sustained disagreement between the two Allies on supply priorities passed without serious practical consequences. It was a harbinger of greater storms ahead.



## CHAPTER XIII RECOIL

(i)

### The Western Atlantic

**T**HE problem of 100-octane shortage, discussed in the last two chapters, appeared just when the British, with American resources behind them, might well have hoped that the tanker shortage was solved. In September 1941 the Oil Control Board had been told by its Executive Committee that there would be no difficulty about meeting the 1942 oil import programmes. But the committee had added a warning. If the United States went to war, it said, the shipping situation would change greatly for the worse.

So indeed it turned out after Pearl Harbour. The new war in the Far East affected the British tanker position in the Atlantic region in two ways. First, the war laid heavy demands on American tonnage. Instead of being available for the British, American tankers being launched in 1942 were taken by the United States Armed Forces for their own needs. Secondly, it meant that British-controlled tankers had to be withdrawn from the Atlantic and sent east round the Cape. Within three days of Pearl Harbour ten of these tankers had already been allocated for eastern service. By the end of February 1942 the British had despatched forty-nine tankers, of some 570,000 deadweight tons, to the Indian Ocean. This was more than 12 per cent. of the total tanker tonnage working in the British oil supply programmes in the West when the Japanese war began.

The effect of these withdrawals was increased by the sharp worsening of shipping conditions in the Atlantic during the first half of 1942. Sinkings increased again to a level recalling the worst months of the previous year. During the summer and autumn of 1941 the western side of the Atlantic, patrolled by the warships of a still neutral America, had been something of a privileged sanctuary for Allied shipping. That sanctuary disappeared after the 11th December, when Germany declared war on the United States. Straightway the U-boats began to assemble in American coastal waters. On 15th

# ATLANTIC AREA

1944

Oil Pipeline.....

Refinery.....▲



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(i)

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January 1942 they sank two British tankers south of Nova Scotia and another south-east of Newfoundland. Two days later a Norwegian tanker was lost in this area and on the same day the Germans sank their first American-flag tanker off Cape Hatteras. This was the beginning of a sustained assault on the stream of unconvoysed vessels carrying oil from the loading ports in the Gulf of Mexico and the Caribbean to the north-eastern seaboard of the United States, and to Halifax, the starting-point of the North Atlantic convoys.<sup>1</sup> The Americans needed time to introduce counter-measures and their losses were heavy. Between January and June 1942 they lost seventy-three tankers<sup>2</sup> in the Atlantic area, twenty-five of them off their own east coast. Eventually, in April, the Americans imposed a total standstill on tanker movements along their eastern seaboard, pending the introduction of convoys. The U-boats then switched their attack further south; between the middle of April and the end of June they sank eleven American-controlled tankers in the Caribbean, and eleven more in the Gulf of Mexico and the Florida Strait. The British were suffering heavily also. Sixty-eight British-controlled tankers were sunk in the Atlantic area in the first six months of 1942, sixteen off the eastern seaboard and seventeen in and around the Caribbean.<sup>3</sup> These losses, together with the despatch of the tankers to the East, led to a big fall in the number available for supplying the United Kingdom. The table opposite shows the effect of these events on the size and distribution of the tanker fleet operating under London's control in the eighteen months following the American entry into the war. Column 2 shows the declining strength of the British-controlled fleet and columns 4 and 5 show the switch of tankers from the west to the east. The impact of the eastern war is also to be seen in the increased use of tankers on fleet attendance duties shown in column 7. Column 9 shows a proportion of vessels immobilised considerably higher than in 1941.

As well as this fall in numbers there was a marked fall in the carrying capacity of the tankers working for the British in the Atlantic. This was not, as perhaps might have been expected from the experience of 1940-41, due to a lengthening of tanker repair queues as a consequence of the higher rate of casualties. In 1942 about a fifth of the tonnage plying to Britain could be permanently regarded as undergoing repairs, which was the same proportion as before Pearl Harbour. The decline was due to the introduction of convoys and diversionary routings which were necessary in the western Atlantic, where vessels had hitherto sailed direct and unescorted.

<sup>1</sup> For an account of these events, see S. W. Roskill, *op. cit.*, Vol. II, Ch. IV (1956).

<sup>2</sup> Including United States-owned Panamanian-flag tankers.

<sup>3</sup> Losses during 1942 are shown in Table 29, p. 376.

TABLE 21  
Employment of Tankers in British Control and Service, December 1941-May 1943\*

Date	Total Tonnage (1)	British Controlled Tonnage (2)	United States Assistance Tonnage (3)	Carrying Petroleum		Carrying other products (6)	Fleet Attendance (7)	Immobilised		000 d.w. tons
				United Kingdom (4)	Cross Trades (5)			Depot Tonnage (8)	Repairing or otherwise not in use (9)	
December 15th 1941	7,847	7,587	260	3,051	2,648	131	455	117	1,445	
March 31st 1942	7,523	7,095	428	2,155	2,952	193	614	107	1,502	
June 30th 1942	7,473	6,640	833	2,370	2,744	114	648	99	1,498	
September 30th 1942	7,972	6,413	1,559	2,754	2,970	101	659	113	1,375	
December 31st 1942	7,640	6,265	1,375	2,450	2,700	60	628	55	1,747	
March 31st 1943	7,421	6,026	1,395	2,452	2,725	54	521	56	1,613	
May 31st 1943	7,394	6,008	1,386	2,479	2,692	48	571	44	1,560	

\* Tankers of 1,600 gross tons or over, excluding American-controlled Shuttle tankers.

† Tankers on British register, Allied and neutral tankers on time-charter to the United Kingdom and other Allied tankers under the control of the Allied governments. This column excludes all American-flag tonnage, but includes Norwegian tankers made available under lend-lease.

‡ Panamanian and United States-flag tonnage working in or made available to the British programme in 1941 and 1942, excluding vessels on British register temporarily, or on United Kingdom time-charter, which are included in column 2. Excluding one Argentinian tanker included in Table 9, column 3.

§ Including tankers in United Kingdom coasting service.

¶ Molasses, grain, palm oil, whale oil, water etc.

⌘ Excluding tankers repairing for seven days or less.

Long before the April standstill the British had taken prompt action to keep their vessels out of the dangerous waters between Halifax and New York and off Cape Hatteras. By April the only British-controlled tankers sailing along the United States eastern seaboard were those carrying cargoes to North Russia.<sup>1</sup> After the standstill only the occasional British-controlled tanker, picking up a cargo in the north-eastern United States, sailed in the waters north of Cape Hatteras. All others, whether bound for the Caribbean or Gulf coast loading ports, were routed south and east of Bermuda on the outward leg; coming home, they sailed due east into the Caribbean sea under the protection of a special convoy organised by the British between Curaçao and Trinidad. They then sailed on to Freetown, Sierra Leone, where they joined the convoys bringing home ships that had sailed from the east round the Cape of Good Hope.<sup>2</sup> In June 1942, twenty-six tankers sailed home via Freetown, completing the round voyage in an average of 83 days. In July fifteen tankers averaged 76 days on the same round journey.

This emergency routing by the British continued until the Americans were able to organise a system of convoys off their own coast. This they did in May though, at first, in a form which offered no saving of time to tankers bound for the United Kingdom. Because of a shortage of escort vessels the Americans introduced convoys only off the most dangerous stretches of their coast; namely, between Key West and Hampton Roads, and between Boston and Halifax.<sup>3</sup> This meant that tankers making their way up to New York or Halifax before joining the North Atlantic convoys lost a great deal of time waiting at the numerous rendezvous points; indeed tankers loading in the Caribbean could not use these convoys at all until July when the Americans were able to provide convoy protection between the West Indies and Key West; and in July tankers using that protection took even longer to complete a round voyage to Britain than those going home via Freetown.

Table 22 shows how the round-voyage times of tankers lifting oil for Britain from Caribbean and Gulf ports—and there were roughly five of these to every one lifting from north-east ports—lengthened as a consequence of war conditions in the western Atlantic. The table also shows the effect of delays in American waters.

<sup>1</sup> At the Moscow Conference, in the autumn of 1941 the Americans had undertaken to supply 100-octane aviation spirit to the Soviet Union. Some of this—and naval and commercial bunker oil required by the Allied convoys to North Russia, was carried in British-controlled tankers. The first two of these sailed from the Gulf on 10th October 1941 discharging in North Russia at the beginning of December. On an average about 40,000 deadweight tons of British-controlled tankers were employed on this North Russian run during the first half of 1942.

<sup>2</sup> See Map facing p. 283.

<sup>3</sup> See *ibid.*

These increases in voyage times are the more striking since they occurred in the summer months when tanker performance ordinarily reaches a seasonal peak.

Throughout the summer of 1942 the British pressed the Americans strongly to improve their convoy arrangements. To reduce the time spent by Britain-bound tankers on the coastwise leg, the Americans substituted New York for Halifax as the western terminus of the North Atlantic trade convoys.<sup>1</sup> This made possible a further improvement—the introduction of convoys which ran direct from New York

TABLE 22  
Tanker Round-Voyage Times 1942

Date of Completion of round voyage and departure from United Kingdom	Caribbean/Gulf ports to United Kingdom west coast net round-voyage times	Time sailing to and waiting in United States waters	Proportion of round voyage spent sailing to and waiting in United States waters
September–November 1941	63½ days	32 days	50%
March–May 1942	68½ days	37½ days	56%
June–August 1942	80½ days	52 days*	65%
September–November 1942	82 days	55 days	67%

\* This excludes vessels that came home via Freetown.

to Key West for vessels loading in the Gulf; and from New York to Guantanamo, Cuba for those loading in the Caribbean. These 'through convoys' began toward the end of August 1942. Until December 1942 tankers in the Gulf were also convoyed.<sup>2</sup>

These changes in the convoy arrangements, together with reforms in the handling of British vessels,<sup>3</sup> improved the movement of British-controlled tankers along the United States east coast. Yet, inevitably, this movement was still much slower than in the previous year. Moreover, for their greater security in American waters, the tankers bringing oil to Britain had to pay a price on the Atlantic crossing. The escorts used in the coastwise convoys were provided partly at the expense of the North Atlantic convoys: these convoys

<sup>1</sup> HX (Halifax–United Kingdom) ten-knot convoys and SC/ON (eight-knot) convoys, also Halifax–United Kingdom. In the early months of the war these SC convoys had sailed from Sydney, Cape Breton Island, off Newfoundland.

<sup>2</sup> See Map facing p. 283.

<sup>3</sup> See below p. 315 *et seq.*

therefore ran less frequently. In the spring of 1942 the interval between sailings widened from six to seven days. In September, when the through convoys got under way, they went over to an eight-day cycle.

These events in the western Atlantic, together with the decline of the Shuttle (which had continued into 1942 on a much reduced scale with vessels unfit for the war zones) caused the performance of tankers carrying oil to Britain during 1942 to fall far below the level of the previous year. Between June and December 1941 tankers controlled by the British Ministry of War Transport had achieved an average rate of over 5 round voyages a year on trips between this country and the oil ports of the Caribbean and the Gulf of Mexico. But between January and April 1942 they were able to average a rate of only  $4\frac{1}{2}$  round voyages a year. Between May and December 1942 the average fell to only  $4\frac{1}{4}$  round voyages a year.<sup>1</sup>

(ii)

### Import Saving: The End of the Basic Petrol Ration

The worsening conditions on Atlantic shipping routes in the early months of 1942 was reflected in the decline of United Kingdom oil stocks. 1942 was unique among the war years in that the usual winter stockfall continued through the spring and into summer. Imports between March and May were over 80,000 tons a week less than in the previous quarter, reversing the normal seasonal trend.<sup>2</sup> By the end of June 1942 stocks had fallen roughly  $1\frac{1}{4}$  million tons below their end-of-February war-time peak. Average weekly imports during May and June 1942 were lower than in any month of 1941 save January.

In 1942, however, the authorities were quicker to react than they had been in 1941. In January, before the fall in stocks had actually begun, further steps to reduce civilian consumption in Britain were already under consideration.

As usual motor fuel consumption attracted most attention. Here the Ministry of War Transport was the first to move. Ever since the spring of 1941 it had been seeking to bring the movement of goods

<sup>1</sup> These are 'gross round voyages', that is they take into account the times spent by vessels undergoing long repairs. The 'net' figures usually used include only 'short repairs' which were reflected in port turn-round times. The figures exclude tankers carrying naval fuel, which were controlled by the Admiralty.

<sup>2</sup> See Table 25, p. 322.

vehicles under closer control by reducing the amount of fuel which operators received automatically. On 16th January 1942, the Ministry asked the Lord President's Committee for permission to abolish the basic allowance for road hauliers at the end of February, when the validity of current coupons expired. The committee gave its approval. From 1st March 1942 all issues of fuel to goods vehicle operators were tied to specific purposes; and it became illegal to use them in any other way without the express permission of a Sub-District Manager. The implications of the change were considerable. Previously the total of discretionary coupons allotted to Transport Regions had been related to the total distributed automatically as 'basic' coupons; in other words, the total issue of coupons as a whole had been determined primarily by the number of eligible vehicles in the region. Now, issues to road hauliers, like those to passenger transport, were governed solely by the authorities' view of the transport work that needed to be done.

It was logical to accompany this tighter control over fuel issues with steps to reduce unnecessary demands for goods transport. Here the aim was to enforce a more efficient use of vehicles through the 'rationalisation' schemes launched in the autumn of 1941 by a public declaration from the Minister of War Transport, Lord Leathers.<sup>1</sup> In January 1942 a public campaign to further reduce retail deliveries was launched under the slogan: 'Carry your Shopping Home'. This had marked success. In the summer of 1941 consumption by retailers vehicles had been 17 per cent. of all fuel consumption by vans and lorries; during 1942 as a whole this item of consumption accounted for less than 12 per cent. of a total consumption figure which had itself become smaller. As for long-distance hauliers the Ministry of War Transport was working to achieve closer control through its proposed Road Haulage Organisation which eventually came into operation in the spring of 1943. Meanwhile the summer and autumn of 1942 saw a succession of zoning schemes introduced for agricultural and horticultural produce. The zoning cut out unnecessary cross-hauls by confining consumers in different areas to their nearest suppliers.<sup>2</sup>

The summer of 1942 also brought further pruning of bus and coach services. At the start of the season Regional Transport Commissioners were reminded that the criterion of need for bus services should be not merely that of inconvenience, but of 'real hardship to inhabitants of outlying villages or troops in isolated camps' which could be served by no other form of transport. The normal summer expansion of regular coach services was reduced, and in some instances eliminated.

<sup>1</sup> See p. 217.

<sup>2</sup> An account of the various rationalisation and zoning schemes and of the setting up of the Road Haulage Organisation will be found in C. I. Savage, *op. cit.*

These restrictions on commercial transport in the months which followed Pearl Harbour were accepted on the understanding that there would be an equally stringent approach towards fuel consumption by private motorists. By January 1942 public opinion was fully aroused to the gravity of the oil situation. For its part, the Lord President's Committee saw further restrictions on motoring as a means to save not only petrol but rubber as well—for rubber was also now in short supply owing to the loss of East Indies sources. It was estimated that the abolition of the private 'basic' would drive some 400,000 cars off the roads: the committee was anxious to get hold of their tyres.

The difficulty was still the administrative one. The Petroleum Department did not think that its regional staff could cope with the applications for discretionary allowances that would flood in when the 'basic' disappeared. When therefore, on 16th January, the Lord President's Committee asked for more restrictions on motorists, the Petroleum Department placed most emphasis on a further cut in supplementary issues. It argued that the reaction to the logging system introduced in 1941<sup>1</sup> had shown that a good deal of excess consumption remained to be squeezed out of priority users, and suggested a further 10 per cent. cut in their allowances. It also urged the Lord President's Committee to put its authority behind a request to other Government civil departments to keep a closer check on their coupon issues. As for the private 'basic', the Petroleum Department suggested only a further cut of one-sixth. This cut would drive a few more cars off the road and make the *coup de grâce* easier to deliver when the time came.

The Lord President's Committee was not entirely satisfied with this response. It accepted the cuts in supplementaries, but it postponed a decision on the 'basic' until it knew the effect that complete abolition would have on the rubber position. At the end of January it received a discouraging report on the possibility of making use of the tyres of laid-up cars.<sup>2</sup> The committee went on to agree, however, that the 'basic' should be cut by one-sixth, at the same time requesting the Treasury to look into the administrative obstacles which might prevent complete abolition of the 'basic'. The Treasury completed its report by the beginning of March. It said that there was no possibility of the Petroleum Department being able to find the staff that it wanted but put forward a proposal that promised to dispense with the need for such staff. The proposal was to grant all

<sup>1</sup> See p. 218.

<sup>2</sup> There was not the plant available for reclaiming the rubber and it would take a long time to collect and retread the tyres for further use as tyres. The report was drawn up by the Petroleum Department in collaboration with the Chairman of the Tyre Control Committee of the Ministry of Supply.

recipients of supplementary petrol allowances an extra discretionary allowance equal to the 'basic' that they were losing, thus leaving the Regional Petroleum Offices free to deal with appeals from those who had been drawing only the basic ration. The Treasury also suggested that the length of the rationing period for supplementary allowances should be extended from two months to three, in order to give the Regional Offices more time to cope with these appeals. Finally the Treasury said that the public should be told that it was the firm intention to end all pleasure motoring and to grant allowances only for purposes which were truly essential. This would discourage applications which had no chance of success.

The Petroleum Department agreed that the Treasury had solved the staff problem. On 9th March the Lord President's Committee ruled that the basic ration for cars should come to an end on 1st July, and the 'basic' for motor cycles on 1st October. July was chosen instead of April (the start of the next rationing period) because it was thought that the Regional Petroleum Offices would be fully extended in April in dealing with appeals against the 10 per cent. cut in supplementaries. However, to avoid disappointing public opinion—which was now keyed up for sacrifice—it was decided to enlarge the proposed cut in April from one-sixth to one-half.<sup>1</sup> The delay in abolishing the motor cycle 'basic' was also for administrative reasons. It was thought that a higher proportion of motor cyclists drawing the 'basic' alone could substantiate a claim for supplementaries. The Petroleum Department therefore prepared to get the motorists' claims out of the way first.

The cut in the 'basic' and in the supplementaries duly came into effect on 1st April 1942. In June, as a further measure, the 44,000 motorists classified as commercial travellers were also deprived, at long last, of their allowance—which they had enjoyed since 1st February 1940—above the normal semi-essential scale.

The ending of the basic ration for private cars in July 1942 did not mean that all the petrol that had been issued to consumers who had not established a claim to supplementaries was saved from that time onwards. For, simultaneously, the authorities introduced a new kind of discretionary issue—the 'domestic allowance'. This was granted to people living in country districts who depended on their cars for a variety of necessary family purposes—such as attendance at hospital or church, shopping or taking young children to school. The maximum domestic allowance gave 120 miles a month, the same as the 'basic' at the time it was ended. But the average allotment was only

<sup>1</sup> This change was convenient from the administrative point of view. The original proposal for a cut of one-sixth had meant halving the value of the basic unit for the first month of the three-month rationing period beginning in April. The revised proposal merely involved extending this through May and June.

half as much. Moreover, fewer than 40,000 vehicles—less than one in seventeen of those which had previously drawn only the basic ration—qualified for a domestic issue. Recipients of domestic allowances consumed about 50,000 tons of petrol a year. But the saving from abolishing the 'basic' proved to be about 180,000 tons a year—which, incidentally, was far more than anticipated.

One other consequence of the abolition of the private basic ration is worth mentioning: the setting up, in June 1942, of volunteer car pools whose members held themselves available for work of national importance, such as helping in billeting and evacuation. This development ensured that a sufficient reserve of cars remained in running order for use in an emergency such as invasion or heavy air attack. Twenty thousand car owners took part in the scheme; they were exempted from licence duty and were paid a mileage allowance.

The cuts in allowances in 1942, like the earlier cuts in 1941, were supported by measures to prevent petrol being wasted through evasion of the regulations. Two main types of abuse were identified in Chapter IX: the misuse by private motorists of fuel that had been purchased legitimately, but for specified purposes; and black market transfers either of coupons or of petrol itself.

Opportunities for the first type of offence were, of course, greatly reduced by the reductions in discretionary allowances. These reductions squeezed out a large number of personal coupons previously used for unauthorised purposes. This effect was reinforced by an Order, published in May 1942, which extended to holders of 'farmers' and 'industrial' coupons the logging system introduced partially and informally, late in 1941, as a check on the use of private motorists' supplementary coupons. The 1942 Order compelled these consumers to keep a record of how they had used the fuel they bought with their 'F' and 'W' coupons.<sup>1</sup> From July 1942 it became easier to detect the misuse of these petrol coupons and, indeed of all coupons, because with the disappearance of the basic ration the purposes for which a private car was driven could now be specifically defined and limited. Thus, a new version of the Motor Fuel Order, published in November 1942, expressly prohibited the use of a motor vehicle for any journey for which public transport could reasonably be employed.<sup>2</sup>

The cuts in discretionary issues also reduced opportunities for the second type of abuse: supply of black market petrol. But it was generally accepted that the main source of this had been the petrol bought against 'X' coupons for use in commercial goods vehicles.

<sup>1</sup> Motor Fuel Rationing (No. 3) Order, 1941 (S.R. & O. 1941 No. 1592) and General Direction (Records) No. 1 (S.R. & O. 1942 No. 902).

<sup>2</sup> Control of Motor Fuel Order, 1942 (S.R. & O. 1942 No. 2400).

The abolition of the commercial 'basic' in March had cut down the quantity of 'X' coupon fuel available for illicit marketing. The Order abolishing the commercial 'basic' also provided for a closer watch on the way in which the discretionary issues were used: it forbade the use of 'X' coupons except for purposes stated on the form of application and not specifically 'disallowed' by the issuing officer. Later, revised forms were introduced on which routes, mileages and loads had to be specified. Composite applications for 'X' coupons were rejected. Opportunities for illegal transactions were further reduced by the ending, in March 1942, of the practice of 'rationing in arrears'—that is, of issuing coupons to cover fuel used in a previous rationing period.

(iii)

### Import Saving: Other Measures

Reduction of petrol allowances was not the only way of saving imports. In April 1942 the Petroleum Department, with the support of the Mines Department, put up a number of proposals to replace imported fuels with home-produced ones, including a suggestion to fit 10,000 heavy vehicles with the Government Emergency Type Gas Producer.<sup>1</sup> The Lord President's Committee doubted whether the import savings, estimated at between 75,000 and 100,000 tons a year, would justify costs in effort and materials. Nevertheless, on 24th April, the committee instructed the Ministry of War Transport to go ahead. In May 1942 the Ministry set up a Directorate of Producer Gas Vehicles under Lord Ridley to organise the manufacture, filling and servicing of the producer units.<sup>2</sup>

The Government coupled the launching of their own scheme for converting vehicles to gas traction with a tightening of control over private conversions. It will be recalled that the Government had given some encouragement to conversions in 1940—in order to widen operating experience—by allowing owners of converted vehicles to draw the same allowance of petrol or derv fuel as before conversion; this gave users of converted vehicles additional fuel that could legally be used for any kind of journey. After the abolition of the basic ration this inducement to convert became very much stronger. The

<sup>1</sup> See p. 98.

<sup>2</sup> For an account of this scheme see C. I. Savage, *op. cit.*, Ch. XI.

Government was forced to consider the possibility that scarce materials and labour would be used on more conversions by motorists and road hauliers seeking to recover the freedom they had lost through deprivation of their automatic allowances. However, the Government could no longer forego the import savings which conversions might bring about. It therefore decreed that vehicles working on gas should in future have their petrol supplies cut *pro tanto*, and that gas traction could no longer be used for journeys for which petrol would not have been granted. For a time the Government considered bringing all forms of motive power—steam and electric as well as gas—within the rationing system. It decided that this was impracticable because of the difficulty of controlling supplies. However it made a new Order,<sup>1</sup> which came into force on the 1st September 1942, and prohibited the driving of gas, electric or steam-driven vehicles without a special licence from the Minister of War Transport. These licences, issued by the Ministry's Regional Transport Commissioners, were only granted if it could be shown that the vehicle was doing essential work and also (to prevent useless conversions) that sufficient supplies of the fuel required were locally available.

In the spring of 1942 the Government also took further steps to foster the regeneration of used lubricating oils, a subject which was still attracting a disproportionate amount of public attention. After the decision, in 1941, to encourage larger lubricating oil consumers to regenerate waste oils on their own premises, many firms had installed their own filter plants and centrifuges.<sup>2</sup> Smaller users had been ignored. The problem of collection was deemed too great to make it worthwhile encouraging them to get their used oil treated at a central point. Early in February 1942 the Petroleum Department investigated the whole question again. There were at that time four specialised firms reclaiming lubricating oil and between them they had the capacity of treating some 25,000 tons a year. They treated supplies mainly from the Armed Forces, and two firms were expanding their capacity. The Department decided that these activities should be encouraged and that the reclaimer firms should also take in waste oil collected from smaller users. The Oil Control Board endorsed this proposal on 9th February. Shell-Mex House was asked to undertake the most difficult part of the work, that is the removal of waste oil from garages. It was thought that they could do this conveniently at the same time as they delivered supplies. The Oil Control Board also directed that waste oil should be burned as fuel at premises from which such oil could not be conveniently collected.

<sup>1</sup> Motor Vehicles (Restriction of Use) Order, 1942 (S.R. & O. 1942 No. 1527).

<sup>2</sup> See p. 188.

This decision to bring small users within the oil salvage scheme was followed, later in the year, by a move toward greater co-ordination. Until the late summer of 1942 collection and reclamation had been completely unplanned. The Armed Forces disposed of their waste oils to the highest bidder; and the reclaiming firms, which sometimes undertook more work than they could properly handle, were inclined to pick and choose whom they would deal with. This was inefficient and wasted transport; the Air Ministry, for instance, sent all its used aero-engine lubricants—from all over the country—to a reclaiming firm in Derbyshire. Accordingly, in September 1942, Shell-Mex House was given the task of co-ordinating collection from all users, including the Services, motor and aircraft engine factories and farmers, as well as garages. The Lubricating Oil Pool allocated these waste oils to the most conveniently situated reclaiming plants. This decision to centralise was followed by a big publicity campaign to encourage users to save their used lubricants. Propaganda and technical advice was issued through such organisations as the Motor Trade Association and the National Farmers' Union. The responsible Government departments appointed liaison officers to Shell-Mex House and themselves took an active part in promoting and organising the work of collection. By the spring of 1943, the Ministry of Agriculture had established 120 collecting centres under the control of County Agricultural Committees to receive waste lubricating oil from farmers' tractors. Collection for reclamation was running at 23,000 tons a year.

These schemes for converting heavy vehicles to run on producer gas, and to reclaim lubricating oil, called for a great deal of effort to make comparatively small savings. In this they reflected the mood of that period. In the spring of 1942 it seemed that no saving was too small to be overlooked. Consistent with this objective the Government took a deliberate decision to reduce consumption to the bare minimum required to sustain the war effort. To quote a paper submitted to the Lord President's Committee on 15th April, the Government 'accepted as inevitable that the pressure of economy should make an inroad on the standard of comfort and convenience enjoyed hitherto by the average citizen'. This new attitude led the Lord President's Committee to revoke two concessions to the 'comfort' of the citizen which it had made the previous autumn. Supplies to oil central heating plants in buildings not directly used for war purposes were cut once more by 25 per cent.; and the 20 per cent. cut in dealers' supplies of domestic paraffin, introduced in May 1941, was also reintroduced. This last cut became effective on 4th April 1942: it was followed, ten days later, by an instruction from Shell-Mex House explaining that, from 12th May, deliveries would be held at the level of the corresponding period of 1941. In the same month deliveries to retailers of

white spirit, increasingly used as a substitute for imported turpentine, were cut by a half.

Among industrial consumers the main effort in 1942, as in 1941, was directed toward increasing the use of tar oil as a furnace fuel in place of imported petroleum. With industry at full stretch and coal in short supply, this was all that could be done. There were two aspects to the campaign: providing the tar oil in the first place; and then persuading plant owners to use it. The limiting factor on supply was the amount of creosote left over after the requirements of the road tar programme had been met, and the feedstock needs of the Imperial Chemical Industries plant at Billingham provided for.<sup>1</sup> In line with its new policy of giving priority to maximum import savings the Lord President's Committee recommended, in April, that Billingham's creosote supplies should be diverted to the creosote-pitch programme. But this recommendation was never carried out. Within a short time Billingham switched over to the production of 100-octane spirit,<sup>2</sup> and this activity took priority over the earlier import-saving project. However, since Billingham needed less creosote on its new programme than formerly, the amount available for use as fuel oil increased commensurately.<sup>3</sup>

The availability of fuel from coal tar products also increased as creosote-pitch mixture replaced pure creosote for burning under furnaces. The amount of creosote burned by itself declined from 150,000 tons in 1941 to under 30,000 tons in 1942. To eke out supplies still further the Coal Tar Control pressed for the use of an even thicker mixture containing more than 50 per cent. of pitch. It suggested that this mixture should be introduced in districts where pitch was in surplus and accumulating stocks at tar distilleries were threatening to bring distilling operations to a halt. Shell-Mex House opposed the proposal on technical grounds and also because it thought the marketing of two types of mixture would make the task of distribution too complicated. Even so the supply of creosote-pitch mixture during 1942<sup>4</sup> comfortably exceeded the 1941 forecast of 500,000 tons a year.

But supply was only half the problem; there was also the need to ensure that the conversion of plants to burn creosote-pitch kept pace with supply. During the autumn and winter of 1941 the conversion programme had been halted because of uncertainty about supply. However, in February 1942 the Petroleum Department embarked on an extended conversion programme. By now many refining

plants had themselves gone over to burning tar fuel; two indeed, in mid-1942, began burning pitch by itself to help the tar distilleries get rid of their surplus. But other industrial consumers were slow to follow the oil industry's lead. Many firms who were directed to use tar oils under the Order of April 1941,<sup>1</sup> pressed their right of appeal to the limit; and they were often supported by Government departments. Frequently there were long delays between the issue of a direction to convert and the start of work on converting. For most of 1942 the supply of creosote-pitch exceeded demand, and stocks began to build up.

But perhaps the most intractable problem in the 1942 search for import savings was that of reducing gas oil imports for the gas industry. Since 1940 the manufacture of carburetted water gas had become a normal feature of gasworks operation instead of, as before the war, an expedient to meet peak loads. Two factors were at work here apart from the general pressure on coal supplies. New water gas plants were replacing old carbonisation plants due for renewal since water gas plants were easier to build. At the same time the yield of gas per each ton of coal carbonised was falling off because in war-time the gasworks could not always obtain the kinds of coal they wanted. As a result, in the twelve months beginning July 1941, the gas industry used 25 per cent. more gas oil than in 1940 and 100 per cent. more than in 1938.

In June 1942 the gasworks problem came before the Lord President's Committee. They saw no way of reversing the rising trend of gas oil consumption but they hoped to check it. They accepted that gas works would use at least 200,000 tons of gas oil in the twelve months from July 1942. But, as a temporary import-saving measure, the Lord President's Committee decreed that part of this consumption should be met from stocks. This last decision had an administrative implication: it entailed creating a new body to allocate supplies between gas undertakings. After consultation with the industry the Government entrusted this task to a small advisory body of experts. Particulars of stocks and deliveries of gas oil at each gas undertaking were collected by the Petroleum Department.

<sup>1</sup> Billingham was using about 130,000 tons of creosote a year and about 250,000 tons of coal a year.

<sup>2</sup> See p. 276.

<sup>3</sup> Instead of producing 109,000 tons of motor spirit a year, Billingham went over to producing 68,000 tons a year of aviation 'base' spirit.

<sup>4</sup> See Table 50, p. 482.

<sup>1</sup> Petroleum Order 1941 (S.R. & O. 1941 No. 546).

(iv)

## West Gap

The climate of opinion following Pearl Harbour not only stimulated further economy measures in Britain but also prompted allocation to Britain of a large number of American-controlled tankers to bolster up oil imports.

It will be recalled that in the autumn of 1941, when the Shuttle tonnage was returned to the Americans, the United States Petroleum Co-ordinator had made it clear that he would be ready to give assistance again when it was required.<sup>1</sup> At the beginning of May 1942 the authorities in London decided that the time had come to take advantage of this offer. They calculated that their end-year stock level would be nearly 2 million tons below requirements unless they got tanker reinforcements. They put their need at seventy 'notional' tankers (that is, ships capable of sailing in ten-knot convoys and carrying 10,000 tons of cargo). On 2nd May, Sir Arthur Salter wrote formally to Mr. Ickes asking for this amount of tonnage immediately, or correspondingly more if some ships were delayed.

The Americans responded twelve days later. They promised to make forty tankers available during the following four weeks almost entirely at ports in the Gulf of Mexico. These tankers made up the 'notional' requirement of 700,000 tons. In the event the Americans improved on their promise. By the end of June forty-five tankers of 684,000 deadweight tons had been assigned to British service. By mid-July thirty-six had already sailed. Among these were vessels whose size and performance made the total contribution in terms of carrying capacity considerably more than seventy 'notional' tankers. For purposes of reference this group of United States tankers came to be known as 'Red Gap' assistance.

Nevertheless, United Kingdom oil stocks continued to fall largely because of the big delays that tankers were suffering in the Western Atlantic. At the same time the end of year stock target was revised upwards to take account of the needs of American forces beginning to arrive in Britain. At the end of July, therefore, the British decided to put in another formal request for help. This time they asked for the equivalent of fifty-four 'notional' tankers. This request was also promptly met. The Americans agreed to provide this 'Blue Gap' assistance, as it was called, on 7th August. By 1st September, thirty-four tankers had been nominated equivalent to forty 'notional'

tankers. The balance of the Blue Gap tonnage was made available in the course of September and October 1942.

American tanker help to Britain was thus on a much bigger scale in 1942 than in 1941. More tankers were made available and they were all able to sail direct to this country. Furthermore Red Gap and Blue Gap tonnage was not the whole of this assistance. At the beginning of 1942 there had been some 250,000 deadweight tons of American-owned or controlled tankers working in the British programme, mainly in eastern trades, either under the arrangements made in 1941, or in the normal course of business. The exact amount of American-controlled tonnage working in British supply programmes after the middle of 1942 varied under the effect of losses, withdrawals and replacements. But, as was indicated in column 3 of Table 21<sup>1</sup> it averaged well over 1¼ million deadweight tons.

How the Americans were able to supply such a large bloc of tonnage so quickly calls for some explanation. In 1941 the Petroleum Co-ordinator had appeared hard put to it to supply 500,000 deadweight tons for the Shuttle, and in doing so he had caused a public outcry. In 1942 the United States was at war and the American armed forces themselves were making prodigious demands for tankers: during the last eight months of 1942 over 1.2 million deadweight tons of United States tankers was taken over for United States war purposes. True, new tankers were being launched all the time. In the spring of 1941, the United States Maritime Commission (prompted and encouraged by the British Merchant Shipping Mission in Washington) had promoted a considerable building programme. At the time of Pearl Harbour ninety-seven tankers were being built in United States yards on behalf of the Commission and another sixty-two were being built under private contracts. But losses outweighed gains. During 1942 the Americans lost 1¼ million deadweight tons of tankers while they built only a million deadweight tons of new ones. They also seized in prize a number of foreign, mainly French, tankers that had fled to the United States after the fall of France. The net effect of all this in the first ten months of 1942 was that the strength of the United States-controlled tanker fleet fell by about a million deadweight tons. The carrying capacity of American tankers also fell sharply because of the new western hemisphere convoys, and because of delays for arming and 'de-gaussing'.<sup>2</sup>

Yet despite these pressures the Americans were able to find about 2¾ million deadweight tons of tankers for their own Armed Forces

<sup>1</sup> See p. 285.

<sup>2</sup> Deliveries to the United States eastern seaboard by sea in 1941 (excluding Shuttle deliveries) averaged 1,175,000 barrels a day. In April 1942, 506 'notional' tankers would have been needed to carry this amount, compared with 306 the previous year.

<sup>1</sup> See p. 211.



and for the British during 1942. They did so, in the first place, by making a swift and radical change in the method of supplying their domestic market; secondly, they restricted their domestic consumption of oil products. To show the effect of these measures the normal pattern of oil supply in the United States must be described.

In 1941 approximately 40 per cent. of American oil consumption took place in the eastern seaboard states, most of this consumption in the north-east states. This market was mainly supplied from the region bordering the Gulf of Mexico, and about 95 per cent. of the oil was taken round by sea, which was much the cheapest means of transport; in 1940, 250 out of a total of 353 United States-flag tankers were employed on these coastwise movements, most of them carrying crude oil to the refineries of the north-east. The north-east states also imported crude oil from Venezuela and Colombia, and fuel oil from the West Indian refineries.<sup>1</sup> To free their tankers for war, the Americans did, in 1942, what they had done in the smaller scale 'rehearsal' of 1941: they transferred as much as possible of their vast coastwise oil traffic to their railways and other forms of transport.

This transfer was organised under the direction of the Office of Petroleum Co-ordinator, which had spent 1941 preparing for this contingency. Much of the emphasis was on pipelines. In May 1941 this Office had suggested the construction of a 24-inch diameter line to carry crude oil from Texas up into Illinois for onward movement by rail or water. This was rejected as requiring too much steel, already in demand for other war projects. However, in the middle of 1941, work began on a pipeline from the Gulf coast—from Baton Rouge, Louisiana to Greensboro, North Carolina. This so-called 'Plantation Pipeline' was opened in February 1942 and came into full operation five months later.<sup>2</sup>

By using the Plantation Pipeline and by connecting up the older existing pipelines, the American oil industry was able, in 1942, to double the amount of oil delivered by pipeline from the Gulf to east coast states. Oil was also moved in tank barges up the major rivers, the Mississippi and the Ohio, and across the Great Lakes. To further develop water transport a big barge building programme was undertaken. However, as Table 23 indicates, it was the American railways which bore the brunt of the oil transport burden after Pearl Harbour. By the spring of 1942, 44,000 rail tank cars (out of 120,000 in use in America) had been switched from other areas to the Gulf-East Coast route; this was made possible by eliminating cross-hauls, and by increasing the radius of deliveries by tank lorry.<sup>3</sup>

<sup>1</sup> The east coast refineries were operated for maximum white products. Hence the need to import fuel oil.

<sup>2</sup> See Map facing p. 283.

<sup>3</sup> For a fuller account see John W. Frey and H. Chandler Ide, *op. cit.*

TABLE 23

*Movements of Petroleum from Gulf to East Coast States 1941-42*

	000 barrels a day	
	1941	1942
Railways	35	625
Pipelines	54	120
Inland Waterways	28	81
Total Overland	117	826
Shipments by tanker	1,421	391
Total Movements	1,538	1,217

Source: John W. Frey and H. Chandler Ide, *op. cit.*, p. 449.

The table shows that overland movements increased sevenfold during 1942, while shipments from the Gulf by ocean tanker fell by over 70 per cent. It also shows that despite all efforts, the United States transport system was only able to carry about half as much oil overland in 1942 as had been delivered coastwise in 1941; and that total movements into the east coast states were 20 per cent. less.

To some extent this shortfall in deliveries was bridged by living on stocks; crude oil stocks at east coast refineries fell from 11½ million barrels at the end of 1941 to 6·3 million twelve months later. But mainly it was met by reducing supplies to the public. On 15th May, the day after Red Gap was approved, petrol rationing was introduced in the eastern United States with a basic ration of three gallons a week.<sup>1</sup> In the autumn paraffin and domestic heating oil were rationed.<sup>2</sup> Meanwhile other western hemisphere countries suffered reduced supplies in consequence of the withdrawal of tankers for war service. In February 1942 the Latin American republics were warned to prepare for a drastic curtailment of their seaborne imports; in July they were told to expect only enough for half their 1941 consumption.

The amount of tanker tonnage released for service outside the western hemisphere during 1942 is indicated in Table 24 overleaf. Some of the vessels that disappeared from western hemisphere trades were sunk. But the overwhelming majority, released by the measures of the Petroleum Co-ordinator's office, enabled the Allies to survive until new American tanker construction was able to make its decisive impact on the supply situation in the Atlantic.

<sup>1</sup> In December petrol rationing was extended throughout the United States. It may be of interest to recall that the basic petrol ration in Britain started in 1939 at between four and ten gallons a month, depending on horsepower.

<sup>2</sup> John W. Frey and H. Chandler Ide, *op. cit.*, p. 116.

TABLE 24

*Tanker Tonnage in Western Hemisphere Trades 1942\**  
(3,000 gross tons and over)

000,000 d.w. tons

End of	Total	United States Eastern Seaboard	Canada Alaska Hawaii	Latin America
February 1942	4.0	2.7	0.6	0.7
May 1942	2.6	1.3	0.8	0.5
August 1942	2.1	0.9	0.7	0.5
December 1942	1.7	0.4	0.8	0.5

\* Excluding tankers employed on the Shuttle.

The Allies did not live through this period with much margin of tonnage to spare. In Britain the story of 1941 was not repeated. Despite the fact that American assistance was much larger there was no dramatic recovery in oil stocks in the summer and autumn of 1942. For this there were a number of reasons which will be analysed in the chapter to follow. One reason will be singled out here, however—delays in delivery—because it raises a question regarding British policy. The tankers allotted in Red Gap and Blue Gap had first to finish what they were doing and, possibly, proceed to another port to load, before beginning their journey to Britain. Thus, although Red Gap was asked for at the beginning of May it was June before the first Red Gap tanker got to Britain,<sup>1</sup> and July before the second arrived. The story was repeated with Blue Gap. The British request in July was calculated on the assumption that all the Blue Gap tankers would be in British service by 1st September; in fact, their average delivery date was the 1st October.

Clearly the British might have fared better if they had asked for the tankers earlier than they did. As early as end-February they had seen clearly that extra tankers would be needed. They told the Americans, that, without them, stocks might be no more than 5 million tons by the end of the year. But, for tactical reasons, the British delayed transmitting a specific request. Fresh in their minds was the memory of American criticism (voiced notably by the United States Naval Observer, who was then still at his post in London) of the way in which American vessels had been used to help build up United Kingdom stocks in the later weeks of 1941.

To ask Washington for tankers at a time when those stocks were at a war-time peak, could have revived this opposition. At best it would have provoked controversy which might have damaged the standing of the United States Office of Petroleum Co-ordinator, then in the midst of a struggle for survival. At worst a new request might have then provoked a refusal difficult to get reversed at a later date. A refusal was all the more likely in that a number of British tankers were then being used in a way the Americans were known to dislike. Despite strong opposition from the oil authorities the Ministry of War Transport had resorted once more to its 1941 expedient of using tankers to reinforce the dry-cargo fleet. In February ten tankers, totalling 120,000 deadweight tons, had been sent to fetch grain from Canada. Each of these tankers made one voyage only as a grain carrier, but it was the end of April before all ten were back in the petroleum trade.

Thus, it was not until the mid-April tanker standstill off the American eastern seaboard, that London judged the mood in Washington to be ripe for a request. Even then the British did not find it plain sailing. Some Americans queried the need for granting the Red Gap tonnage; they said that the solution to the British tanker problem should first be sought in the East where tanker turn-round in ports was very slow. American agreement, when it came, came, in British eyes, 'dramatically and almost unexpectedly'.

As for Blue Gap, the need here became obvious almost as soon as Red Gap was granted. It was difficult of course, to calculate precisely how many tankers would be required in a period when the western hemisphere convoys were still being organised. But again the delay in making the request was also partly tactical. In the summer of 1942 the British attached more importance to improving the system of allocation than to getting more tankers into their service. Their instinct was to use the situation they saw arising over United Kingdom supplies as a lever to secure such improvement. Indeed the request for Blue Gap might have been delayed even longer but for prodding from the American side. In July the new United States Petroleum Attaché in London sent home an alarmed report on the United Kingdom stock position, rather to British annoyance. The United States Office of Petroleum Co-ordinator took this as a cue to offer more tankers. The formal British request came after the offer.

However, the timing of the American tanker deliveries was only one of many factors contributing to the slide in United Kingdom oil stocks which began in the spring of 1942. It is time now to look more closely at what happened.

<sup>1</sup> This was the fast tanker, *Ohio*, which was then used to run supplies to Malta.

## CHAPTER XIV

### SURVIVAL

(i)

#### Fourth Winter : Third Crisis

AT the end of November 1942 oil stocks in Britain stood 1.2 million tons below the 'minimum' target level for the end of the year which the Oil Control Board had sanctioned that spring. Apart from the timing problems concerning American tanker assistance discussed in the previous chapter, there were, in addition, several other factors which upset calculations. For one thing, deliveries of surplus bunkers—now a substantial item in import programming—were much lower than expected. Secondly, there were frequent, but unplanned for, transfers of tankers from the Atlantic into the Eastern programme to replace vessels in need of repairs or re-fitting. For this reason, between March and December 1942 fifty-five tankers of 657,000 deadweight tons were transferred from West to East and forty-eight, of 550,000 deadweight tons, were sent from East to West. Thirdly, in the final four months of the year, a number of British-controlled tankers, conveniently loading in the Caribbean, were lent to the Americans to make up special all-tanker convoys to carry bunker oil across the Caribbean to the Panama Canal Zone, where it was needed because of ship re-routeing. This was a gesture worth making. It helped to mollify opposition among the American Services to Blue Gap; it was also a concrete example of the pooling principle on which London was laying such stress. But it deprived Britain of tankers at a time when she was in need of them.

These were minor factors, however. A more important influence on United Kingdom stocks in the late months of 1942 was the launching of *Torch*—the landing in North Africa. *Torch* began on 8th November and affected United Kingdom stocks in two ways. First, it diverted oil supplies from Britain; by the end of the year at least thirty tankers, including some Blue Gap vessels, had carried cargoes across the Atlantic to North Africa instead of to this country. Secondly it depleted United Kingdom stocks directly, since supplies

for the British forces in *Torch* were all drawn from Britain. Counting 'packed' as well as bulk supplies, between 300,000 and 400,000 tons of oil products were transferred from United Kingdom stocks in support of the North African landings between October and December 1942.

Coincident with *Torch* the Americans took the decision to withdraw all their largest and fastest tankers from routes across the Atlantic. These 15,000-ton 'Greyhounds'<sup>1</sup> were capable of fourteen knots or more, and had therefore been allowed to undertake crossings unescorted. The Americans decided to withdraw them because, after losing four in the space of a month, they were no longer willing to allow them to proceed without escort. At the same time the Americans were reluctant to waste the speed of these 'Greyhounds' by sailing them across the Atlantic in ten-knot convoys. Their decision was a serious blow to United Kingdom oil imports. 'Greyhounds' had begun to sail for Britain in the second half of 1942—eleven of the Red Gap tankers were 'Greyhounds' and ten of the forty-two Blue Gap tankers were 'Greyhounds'. Because of their larger size and speed—particularly the fact that they were expected to sail independently and be thus free from convoy delays—their carrying capacity had been reckoned as equivalent to that of two ordinary tankers. Now, however, these 'Greyhounds' could not be used in British service as had been intended.

The Americans were not unmindful of how their restrictions on the use of 'Greyhounds' would affect the United Kingdom's oil imports, and did what they could in mitigation. For example, in August 1942 the Americans took over responsibility for supplying Iceland, hitherto fed direct from United Kingdom stocks. The Americans were willing to use their 'Greyhounds' in this particular service, despatching them in ten-knot convoys but allowing them to break away at sea to do the final stretch of the voyage on their own. To help United Kingdom imports more directly the Americans also put up a plan, the so-called Kurtz Plan<sup>2</sup>, which they contended would make good most of the import loss incurred by withdrawing the 'Greyhounds' from the Atlantic crossing. The plan was to permit these 'Greyhounds' to sail independently between the Gulf and Caribbean loading ports and New York—a renewed but faster version of the old Shuttle scheme. Using the unescorted 'Greyhounds' in this way would mean eliminating the delays involved in sending slower tankers down to the Gulf or Caribbean in eight-knot coastwise convoys and then bringing them back north again in convoy. Instead, the slower tankers could lift their oil in New York

and it was calculated that this system would cut thirty days from their previous round-voyage times on trips between Britain and her western hemisphere oil sources. Although the Kurtz Plan would involve a decline in oil deliveries to Britain,<sup>1</sup> the Americans argued that this decline would be small: and would be compensated for by the greater security of the 'Greyhounds'. With *Torch* barely a few months ahead, the Americans may also have wanted to keep their 'Greyhounds' close at hand, ready for emergency tasks at short notice.

The British expressed strong opposition to the decision to withdraw the 'Greyhounds' from trans-Atlantic routes. Keeping fast and efficient ships out of the areas of danger was contrary to their own practice; nor did they judge the danger sufficient to warrant the withdrawal. But they had to accept the situation with what grace they could muster. They stipulated, however, that they should be allowed to begin lifting their Kurtz Plan supplies immediately the 'Greyhounds' were withdrawn instead of after deliveries by this so-called fast Shuttle had begun. The Americans agreed to this; and the British began to lift additional supplies from New York in the early part of November.

(ii)

### Peak of Austerity

Meanwhile the continued fall in oil stocks had prompted the Petroleum Department to take further measures of import saving. 'I recognise', wrote the Secretary for Petroleum to the Lord President's Committee early in October 1942, 'that the further restrictions in civil consumption of motor spirit must add to the inconvenience, and indeed hardship, which rationing has already produced, and that the saving will be small in bulk'. However, he went on, 'if we are to insist on further savings by essential industry and if we are to impress the United States with the need for further sacrifices in their domestic sphere, we must, I suggest, demonstrate that we have done everything possible'.

The Petroleum Department's object was to save another 100,000 tons of petrol a year; and it believed that it could do this at the expense of holders of supplementary coupons. Its suggestions were, briefly: to reduce 'essential' allowances by a tenth from 1st December 1942 and to cut those who received more than the normal

<sup>1</sup> See Appendix V, p. 389.

<sup>2</sup> Captain T. R. Kurtz, author of the plan, was Chairman of the American Tanker Overseas Committee.

<sup>1</sup> The Ministry of War Transport calculated it at 8,000 tons of oil a year for each 'Greyhound' diverted.

maximum by a sixth on top of this, while restricting 'residential journeys' (that is journeys between home and business which were eligible for allowance) both in number and in mileage; to cut the allowance for semi-essential purposes by a quarter from December and by another 15 per cent. the following March, thereby reducing the maximum to 145 miles a month; to press local authorities to reduce their consumption by between 5 and 10 per cent.; and to instruct Government departments (which had reduced their consumption by only 6 per cent. in the twelve months ending May 1942 although they had been asked to make a cut of one-fifth), that they must save 10 per cent. beginning in December. The Petroleum Department also suggested discriminating against high-powered cars by basing allowances on an assumed performance of 20 miles per gallon or more.

These proposals were all accepted by the Lord President's Committee. They were not, on this occasion, accompanied by new cuts in supplies for goods transport. As the Ministry of War Transport pointed out, fuel savings by road haulage were coming about as a by-product of rationalisation and the elimination of cross-hauls. But bus and coach services were further pruned. The normal summer expansion of regular services was reduced or avoided altogether. In many towns there were drastic cuts in Sunday bus services. Weekday buses ceased to run after 10.30 p.m., 10 p.m. or even, in smaller towns, 9 p.m. A notable casualty of this period was London's Green Line bus service.

New steps to restrain paraffin consumption both by household users and farmers were also introduced in the late summer and autumn of 1942. On 1st September a 15 per cent. cut was made in deliveries of domestic paraffin to retailers and large consumers. This, the last of its kind in the war, reduced them to 68 per cent. of the level in the corresponding period of 1940.<sup>1</sup> As before, Shell-Mex House was given discretion to meet special requirements and to avoid creating special hardship.<sup>2</sup> This cut had been preceded, on 16th July, by an Order giving the new Ministry of Fuel and Power a wide authority to control the supply, consumption and use of 'coal, paraffin oil, gas, electricity, liquid fuel, wood fuel, candles, night lights' or other substance which 'generates light, heat or power'.<sup>3</sup> It was

<sup>1</sup> This cut was not maintained beyond October. This was because the Petroleum Board operated under an instruction, sent out on 12th May 1942, that henceforth deliveries would be fixed at the same as the level obtaining during 1941. The effect of this was that during September 1942 retailers got 68 per cent. of the 1940 level; from October they got 85 per cent.; from the following April they got 68 per cent. again. This sequence (85 per cent. of 1940 from October to April, and 68 per cent. from April to October) continued for the rest of the war.

<sup>2</sup> The effective reduction was calculated at 10 per cent.

<sup>3</sup> Control of Fuel Order, 1942 (S.R. & O. 1942 No. 1417) replaced by Control of Fuel (No. 3) Order, 1942 (S.R. & O. 1942 No. 2510).

followed, later in September, by a series of Orders aimed more particularly at keeping down demand for fuels used for household purposes. For instance, the purchase of gas, electricity and paraffin appliances was forbidden without a licence; the extent to which lighting could be used in shop windows and elsewhere was restricted;<sup>1</sup> the hours and seasons when central heating could be used were prescribed;<sup>2</sup> it was forbidden to use fuel to heat greenhouses without permission.

Meanwhile, for the first time in the war, the authorities were also taking a critical look at the fast rising consumption of vaporising oil, the paraffin used as a fuel by approximately 90 per cent. of British farm tractors.<sup>3</sup> This was now more than twice the pre-war level, and reflected both the intensive effort to grow food in Britain and the increasing mechanisation of British farming. Thirteen million acres under the plough in 1938 had become eighteen million by 1942; and the number of tractors in use had grown from 53,000 to 120,000.

The Petroleum Department examined these demands of the farmers in conjunction with the Ministry of Agriculture and Fisheries and Shell-Mex House. It was not worried by the rise in consumption, nor by the fact that the rise would continue, since the area under wheat was to increase by a million acres during 1943. But the Department was concerned at evidence that the rise was larger than it needed to be. During 1942 the average consumption of each tractor was 4 tons of paraffin a year; before the war it had been only 2.8 tons. This increase in consumption was not conclusive evidence of waste, since the marginal land being cultivated in the war years demanded a heavier effort from tractors working on steep slopes, or on marshy land, or on land which first had to be cleared of stones or tree-stumps. But the Department also had evidence of careless handling of paraffin by farmers, of the misuse of it, and of unnecessarily high consumption by tractors which were not being properly maintained. There were good reasons why farmers might be careless of paraffin supplies. Throughout the war, they had been able to obtain tractor paraffin on demand, whereas they had had to get their petrol with coupons allocated by the Regional Petroleum Office. When, in 1941, petrol supplies to farmers had been cut in an attempt to squeeze out wasteful consumption, supplies of tractor paraffin had been left untouched. Thus farmers were not economy-minded about paraffin and it was natural that they should seek to save their petrol by using

<sup>1</sup> Control of Fuel Order, 1942, General Direction (Standard of Lighting) No. 1 (S.R. & O. 1942 No. 1930).

<sup>2</sup> Control of Fuel Order, 1942, General Direction (Central and Hot Water Plants) No. 1 (S.R. & O. 1942 No. 1928) and No. 2 (S.R. & O. 1942 No. 1929).

<sup>3</sup> Of the rest about 5,000 used burning oil in 'hot-bulb' engines, and the others petrol.

their paraffin-fuelled tractors for haulage jobs for which they would normally have used a petrol-driven vehicle. They also wasted it by using tractors to draw loads below their maximum capacity, and by leaving tractor engines running. (This saved petrol which most tractor engines required for starting). There were numerous minor, but cumulatively important, instances of carelessness and misuse, such as the use of leaky cans, spillage when filling the tank, use of paraffin as a cleaner.

The Petroleum Department therefore decided that it was time the farmers were induced to economise. Consumption in 1943 had been estimated at 600,000 tons, four times as much as in 1938. The target was a reduction of 10 per cent.

This raised a problem not present when the amount of petrol consumed in agriculture was being reduced. In the case of petrol it had been possible to adopt the simple device of a flat cut in supplies; if the 'flat cut' proved too drastic the farmer appealed. If he made out his case his allowance was restored, either partly or *in toto*, by the Regional Petroleum Office, which after two years' experience of assessment, had a good idea of each farmer's needs. But there was no such background knowledge about farmers' requirements of tractor paraffin. A flat cut could have seriously disrupted the working of some farms before supplies were restored.

The authorities therefore decided to rely on a publicity campaign to curtail demand. Their aim was to impress farmers with the need for economy and to show them how it could be achieved. During 1942 and 1943 pamphlets, leaflets and lists of instructions were directed at farmers from many sources—the Ministry of Fuel and Power,<sup>1</sup> the Petroleum Board, the Ministry of Agriculture and Fisheries and the Tractor Users Association Ltd.<sup>2</sup> Farming journals carried appeals for economy, and radio programmes on farming matters gave information and advice on how to reduce consumption. Early in 1943 the Ministry of Agriculture and Fisheries appointed County Machinery Instructors with the special task of ensuring that farm machinery was properly used and maintained. Later, these instructors were given the task of teaching methods of fuel economy; and a special Fuel Economy Officer was appointed to the Machinery Division of the Ministry of Agriculture and Fisheries to guide them. The County Machinery Instructors made a big effect to get farmers to buy special funnels for the fuel tanks of their tractors to avoid waste by spilling; and to persuade those who owned Fordson tractors (about 80,000 tractors in use were Fordsons) to purchase a device called the Fordson 'restrictor' which had been developed during

<sup>1</sup> This was set up on 10th/11th June 1942 and incorporated the Petroleum Department.

<sup>2</sup> The Tractor Users Association Ltd. was a non-trading, non-profit making body which existed to give its members free legal advice and information.

1942, with the encouragement of the Petroleum Board. This reduced consumption by changing the carburettor setting. It was estimated that if every Fordson tractor were fitted with a 'restrictor' 20,000 tons of paraffin oil a year would be saved. Many farmers did buy the funnels and 'restrictors'.

Attempts were also made to persuade farmers to plan their work better; for instance, to avoid frequent stops by tractors, thus reducing waste from engine 'idling'. Not surprisingly, the Machinery Instructors were less successful here. Farmers were ready enough to take advice on improving the efficiency of their machinery, but they did not like being lectured on their misuse of fuel and reproved for their misdeeds. It became apparent, as 1943 wore on, that too much was being asked of the instructors. They not only needed the qualifications of engineers and fuel experts; they also needed quite exceptional tact. Early in 1944 they handed over their responsibility for fuel economy to the War Agricultural Executive Committees, which appointed special officers to deal with it.

Tractor paraffin was not the only field of fast rising consumption where there were strong grounds for suspecting waste; another was the oil used for gas manufacture. For one thing there was doubt whether all gas companies understood the need for economy; as recently as January 1942 they had been told to make as much carburetted water gas as they could, both to save coal and to avoid the need to take on retort house labour to meet peak loads.

It will be recalled that, in the summer, the Lord President's Committee had sought to save gas oil imports by a policy of running down stocks.<sup>1</sup> In September 1942 the authorities went a stage further. They set up a new body with the task, broadly speaking, of seeing that gas undertakings did not use more oil than they needed to meet their scheduled gas output. This body, the Gas Industry Oil Committee, was created out of the advisory committee of gas industry experts which the Government had set up in June to supervise the allocation of gas oil between undertakings. But it was given broader functions than the advisory committee and brought into closer connection with the Petroleum Department. Its terms of reference were to advise that Department on the use of oil for the manufacture of carburetted water gas. Its Chairman was Mr. A. E. Sylvester, General Manager of the Gas Light and Coke Company, and on it sat representatives of the six largest oil-using undertakings and of the Coal, Petroleum, Gas and Electricity Divisions of the new Ministry of Fuel and Power.

During the autumn of 1942 the Gas Industry Oil Committee devoted itself to seeing that smaller undertakings got the most out

<sup>1</sup> See p. 297.

of the gas they were using. A small committee of gas engineers under the Ministry of Fuel and Power's Director of Gas Supplies, was appointed to improve efficiency in the operation both of carbonising plants and water gas plants. In December 1942 this committee issued a series of 'pointers', giving technical advice on operation. Regional Advisory Boards were set up within the gas industry to permit smaller firms to benefit from the experience and advice of larger ones. In the same month gas undertakings were notified that the policy requiring them to make maximum carburetted water gas was no longer in force.

The Gas Industry Oil Committee seriously considered lowering the calorific value of the gas 'make' in order to reduce the oil needed in the carburetting process. For technical reasons (and because it was desired to keep up the output of benzole which depended on the manufacture of a well enriched gas) it decided against any general reduction. However a number of individual undertakings had found it possible, without serious disadvantage, to lower the calorific value of their gas in 1941; and this process was continued in 1942. Ultimately about 140 gas undertakings reduced their demand for gas oil in this way.<sup>1</sup>

There remains one field of import saving to be considered. It was one which the British government stubbornly refused to enter, even in late 1942. Its refusal was the more remarkable for being maintained against strong disapproval by the British oil industry, and by the Americans.

In the spring of 1941, it will be remembered,<sup>2</sup> it had been agreed that, aviation spirit apart, there could be no case for continuing to operate any refineries in Britain working on imported oil except those making essential bitumen from 'topped' crude. Subsequently economies in the use of bitumen made it possible to reduce the throughput even of the bitumen plants; the small bitumen refineries were closed down before the end of 1941. By the end of 1942, Shell-Mex House had ceased to operate Fawley refinery, which had been kept open only as a bitumen producer.

However, following the reprieve<sup>3</sup> they had been granted in the previous autumn, the United Kingdom lubricating oil plants had resumed full-scale operations in early 1942 with only a short break at the turn of the year. Some of these plants worked on home-produced fuel, but, even so, their operations entailed an element of 'refinery loss', estimated to raise imports by about 100,000 tons a year. In the summer of 1942 great inconvenience had been imposed upon private car owners to make savings of that magnitude.

<sup>1</sup> Return relating to all Authorised Gas Undertakings in Great Britain 1938-44 (H.M.S.O. 1946) and *ibid.*, 1945-46 (H.M.S.O. 1948).

<sup>2</sup> See p. 204.

<sup>3</sup> See p. 215.

The United Kingdom lubricating oil refineries had been kept in operation because the British authorities were uncertain whether American refineries would be able to supply all the high grade engine lubricants the Allies would need. This uncertainty appeared to be ended in August 1942 when the Americans reported that all British requirements could be met. Accordingly, Shell-Mex House suggested that all United Kingdom production of lubricants from imported oils—even of those produced from the distillate emerging as a by-product of bitumen manufacture—should be ended, to save man-power as well as tanker space. The United States Petroleum Attaché in London made the same recommendation to Washington.

Throughout the autumn of 1942 the Government carefully weighed this advice. They were conscious of the fact that the United Kingdom plants could at best contribute only a small proportion of Allied needs; and also of the need to impress American opinion by making import saving gestures. Nevertheless the eventual decision was against closing the lubricating oil plants. 'I feel', wrote a senior Petroleum Department official in November 1942, 'that there are some important national advantages in keeping a relatively small position in regard to such an important product'. Apart from this wish to keep some independence the Petroleum Department was also influenced by the difficulty of extracting any hard and fast guarantee of lubricating oil supplies from any responsible official in America; and the Department took a less sanguine view of the supply prospects than Shell-Mex House. There was also a wish to preserve refining capacity in being in order to treat Britain's native crude oil.<sup>1</sup> This was no minor consideration. A British oilfield, discovered just before the war at Eakring, in Derbyshire, had raised production to just over 100,000 tons a year. Eakring crude oil was initially refined at the Anglo-Iranian Oil Company's shale oil refinery at Pumpherston in Scotland and then, from June 1942, at the more conveniently situated Lobitos Oilfields' refinery at Ellesmere Port, which was able to handle the whole output at that time. Eakring 'crude' was particularly suitable for making lubricating oil, and there were plans to double the field's output with the help of drilling equipment from the United States.<sup>2</sup> 'It would obviously be absurd', the Petroleum Department argued, 'to find ourselves in a position where, having secured the additional production, we had not the refinery capacity to deal with it.'

<sup>1</sup> There was also the old problem of Manchester Oil Refinery. This company was not strong enough to survive a closure, which would, in the words of the Petroleum Department official, have had 'political repercussions'.

<sup>2</sup> In the event, 1942 proved to be the peak production year and it was never necessary to find additional refinery capacity for Eakring crude.

The Government's decision to keep the lubricating plants going disappointed Shell-Mex House—which repeatedly expressed its disagreement and did not conceal these feelings from the Americans. Shell-Mex House was roundly rebuked by the Government for this attitude in March 1943. The Government's policy was also criticised, however, by the United States Petroleum Attaché in a memorandum to the Petroleum Department. American feeling was affected by the threat to the continued operations of the Caribbean refineries arising from the piling up of black oil stocks at those plants towards the end of 1942. The Americans would have preferred the British to import more of the Caribbean's finished products in place of feedstock for domestic refineries.

Early in 1943 the long-term supply prospects for lubricating oil strengthened. Returning from a visit to the United States the Chairman of the Lubricating Oil Pool reported that the Americans now expected to produce much more high grade lubricants than they needed. However, having made their decision the British kept to it; and the United Kingdom lubricating oil plants continued to operate on imported feedstock throughout the remainder of the war.

(iii)

### Focus: New York

Restraining demand on the home front made the United Kingdom supply problem somewhat easier; solving the problem still required measures to raise imports. At the start of December 1942 the British were more concerned about the future in the short term than at any time since the beginning of the war. When they looked ahead they saw steeply rising demands. There was the build-up of American forces in Britain with still a chance that the invasion of Europe would be launched within the next six months. There was the new, and increasingly heavy, drain of *Torch*; estimates were that the British forces in North Africa would require 1.3 million tons of oil from United Kingdom stocks during 1943. Yet these stocks were already more than a million tons below safety level. Moreover, when it came to replenishing these stocks, the tanker situation was not reassuring—in fact the worst season for Atlantic shipping was just beginning. In an appeal to the American President, the Prime Minister expressed British anxieties: 'if the present situation is allowed to persist', he cabled on 18th December, 'our stocks will be reduced in the coming months to such a degree that it may be necessary to restrict the

movements of our warships and oil-burning ships, which would affect the North Russian and *Torch* convoys'.

The question was how to go about improvement. With Red Gap and Blue Gap the British had already been given their share of the tanker reserve; there was no more to draw on. In the long run the answer lay with the shipyards in the United States. In the short run the only solution was to wrest more carrying capacity from the tankers already in service. London was well aware of this. As far back as August 1942 the Oil Control Board's Executive Committee had spoken of the need to 'impress upon the naval authorities of both countries (who organised convoy movements) the vital necessity of further improvement (in voyage times) at the earliest possible moment'. In the months which followed the British and Americans launched a two-pronged drive towards this objective. They began on delays in ports and coastal waters. Then they took steps to shorten the time tankers were spending on the high seas.

In 1941 the worst delays had occurred in United Kingdom ports and coastal waters; in 1942 it was in the ports and coastal waters of America that tankers were losing most time. By early October the British Merchant Shipping Mission in Washington had become highly critical of the handling of British-controlled tankers off the American coast. In a three week period ending 10th October, it noted, there had been no less than ten instances of tankers missing sailing opportunities in New York on occasions when they had been in every way fit to sail. The Mission calculated that the voyage time of nine of them had been lengthened by eight days due to this situation. Inefficiency with tankers anywhere in the world was bad enough while United Kingdom stocks were falling rapidly; it was intolerable when it took place right on the doorstep of the Americans, and just after American tankers had been released in considerable number to reinforce the British-controlled fleet.

The Mission diagnosed the trouble as one of liaison. In theory, control over the movement of British-controlled tankers in western hemisphere waters was vested in the New York office of the Ministry of War Transport under Sir Ashley Sparks.<sup>1</sup> In practice, control was exercised by Shell-Mex House which, in the spring of 1941, set up in New York its own office, the so-called Shuttle Office. In the early days of its tanker responsibilities, the Shell-Mex House Shuttle Office had worked within a framework of British naval control directed from naval headquarters in Ottawa, and operating through 'British Routeing Officers' stationed at various North American ports. But the institution of the American coastwise convoys together

<sup>1</sup> In October 1942, the so-called Tanker Division of the Ministry of War Transport's New York office consisted only of its director and one clerk.



with the moving of the British terminus of the North Atlantic trade convoys (HX and SC) from Halifax to New York, had transformed the situation. The controlling naval authority for all convoy movements off the American coast became the United States Navy Department in Washington. This meant that communications were broken between the naval and shipping authorities. In New York, neither the Ministry of War Transport Office nor the Shell-Mex House Shuttle Office had any regular channel of contact with Washington; they were thus completely out of touch with the daily-changing convoy situation. Tankers operating under Shell-Mex House missed sailing opportunities, or found themselves unable to sail when they expected to do so. Moreover if, for any reason, a British-controlled ship fell out of convoy off the American coast, the British in New York were not automatically informed.

Clearly administrative arrangements in New York were in urgent need of reorganisation. It was becoming increasingly obvious that a civilian body like the Shuttle Office, which lacked official standing, was not the most appropriate medium for day-to-day contacts with the American naval men in New York and other ports. In October 1942, at the suggestion of the British Merchant Shipping Mission, the Ministry of War Transport Office in New York set up a new Intelligence and Movements Control Section. This was fed with information about the movements of British-controlled ships from every British source up and down the American coast and removed the risk of delays going unnoticed. Then, in November 1942, the head of the New York Shuttle Office, Mr. B. P. Coppinger, joined the Ministry of War Transport's New York office as head of its Tanker Division; he took many of his staff with him. Later, in February 1943, two assistant directors for the division were recruited from the oil industry. Thus in New York, the Ministry of War Transport Office was put in a position to do its job effectively; and the Shuttle Office, relieved of its responsibility for tanker movements, was left to organise cargo arrangements.

This still left unsolved the problem of liaison with the Navy Department in Washington. The main difficulty here was that convoy plans were secret, and the American Services disliked sharing secrets with civilian bodies. The Navy Department did, however, have a close working relationship with the British Admiralty Delegation in Washington, and through this delegation the British Merchant Shipping Mission was able to keep itself informed about convoy arrangements. However, the Mission could not relay this knowledge to the Ministry of War Transport Office in New York. What it could and did do was to organise a system of regular consultation through which that Office could receive informed advice in specific cases. This arrangement did not entirely rule out the risk of

New York giving wrong movement orders; but it made this more unlikely.

These improvements in British organisation in the United States were rounded off by bringing the supervision of tanker turn-round in American ports directly under the authority of the Ministry of War Transport in New York. Hitherto this work had also been left to Shell-Mex House which, since 1941, had had marine superintendents at all the Caribbean oil ports and in Halifax. In October 1942 Shell-Mex House moved its Halifax superintendent to New York, now the major port of call for British tankers; later other superintendents were added, both to New York and elsewhere in the United States. From 1st March 1943 all these tanker superintendents in American ports were attached to the Ministry of War Transport, New York.<sup>1</sup> This new status gave the superintendents more authority with tanker skippers, and better standing with the United States naval authorities. An indication of the kind of work they faced can be gathered from instructions given to the Principal Tanker Superintendent early in 1943. He was told to make 'full investigations into any case where it appears a master has deliberately thrown away tanker days', and make a report to the New York office. This 'could form the basis of any higher enquiries'.

These British steps to improve tanker performance on the western side of the Atlantic were accompanied by American measures to reduce tanker delays in New York—likely to increase in January 1943 when the HX convoys were to change to a ten-day cycle, with the coastwise convoys remaining on an eight-day one. In order that tankers arriving in New York could join either a coastwise or trans-Atlantic convoy at the earliest opportunity, the Americans prepared to establish in New York a pool of petroleum stocks under control of the United States Navy. Into this pool any tanker arriving from loading points in the south would be able to immediately discharge its cargo; and any tanker arriving in the western hemisphere to load cargo could draw it straightway out of the New York 'pool'—without waiting for a southbound coastwise convoy—if a trans-Atlantic convoy were ready for the return trip. Thus each tanker arriving in New York had a choice of either loading or discharging there, whichever course involved it in the least delay.

The British were wary of this idea at first. They suspected it as a device to bring the movements of British-controlled tankers off the American coast under American direction. They had reason to be apprehensive in view of the admitted shortcomings of their own

<sup>1</sup> Like their colleagues in the United Kingdom they continued to be paid by Shell-Mex House.

methods of tanker handling. Reassured on this score, however, the British saw the advantages of the new system, and the New York Navy Pool came formally into operation on 15th December 1942. Although taking its name from New York, the Pool, from its early days, included storage at other north-east American ports, eventually including the Shuttle storage that Shell-Mex House had been renting at ports other than New York since 1941. Into the Pool were discharged cargoes carried by the Kurtz Plan 'Greyhounds'; by convoy-speed tankers which, for one reason or another, could not be used for Atlantic crossings; by tankers proceeding to the north-eastern ports to dry-dock; and by new vessels on proving runs. From the Pool cargoes were drawn by tankers carrying the Kurtz Plan supplies to Britain in the regular HX (ten-knot) and SC (eight-knot) trans-Atlantic trade convoys; and tankers taking oil to the United States forces in *Torch* in American-directed UGS (nine-knot) and UGF (13½-knot)<sup>1</sup> convoys. Ships calling at north-east American ports also bunkered at the Pool.

The New York Navy Pool began as a device to speed up tanker handling at New York and other north-eastern seaboard ports. But its name and operation became associated with another innovation which actually preceded it in point of time. In the autumn of 1942 the Office of the United States Petroleum Co-ordinator decided that some of the oil supplies being carried mainly by rail from the Gulf coast states to the states of the north-east to meet domestic requirements there should be diverted for 'offshore' lifting. By the end of November 1942 the Office had arranged to set aside some 100,000 barrels (roughly 12,500 tons) a day from these railborne deliveries. When the New York Navy Pool was inaugurated, in mid-December, these railborne supplies supplemented the supplies it was getting by sea. By that time the overland movements for offshore lifting had already reached a rate of 140,000 barrels (17,500 tons) a day.

The flow of this 'overland' oil into the New York Navy Pool was to make the major contribution to oil movements across the Atlantic during 1943. It cut the distance by sea between Gulf coast oil sources and Britain while by-passing what was far and away the most time-consuming leg of that journey—the slow eight-knot convoys up the United States coast to New York. The British welcomed this contribution from the Petroleum Co-ordinator's office with open arms. They saw that oil would now be made available at New York for onward-lifting in British-controlled tankers not, as with the Kurtz Plan, by utilising precious 'Greyhounds', but without calling on shipping resources at all.

There was, of course, a price to be paid, and it was the American

public who were called upon to pay it. By the autumn of 1942 Americans in the eastern states already had experience of rationing. With the onset of winter there were many who were suffering, or who thought they were about to suffer hardship from the shortage of domestic heating oil. The rationing scheme did little to help. In the words of an American source: 'many consumers, faced with the rigours of the New England winter which was already upon them, took all they could get and hoarded it . . . the shortage reached its climax on 17th December, the day Boston's public buildings were prepared for mass home evacuations'.<sup>1</sup> However, supported by the Navy Department, the Deputy Petroleum Co-ordinator held his ground. He had much tribulation still to face. In January floods impeded railborne movements and ice brought tankers and barges on the Great Lakes to a halt. In March it became necessary to cut the basic petrol ration by half, a move which brought a hail of protest telegrams down on his head. So far from being daunted, the Deputy Petroleum Administrator for War, as he now was, continued preparations to divert even more oil from the domestic market. By the middle of April 1943 railborne deliveries to the New York Navy Pool had risen to 220,000 barrels (27,500 tons) a day.

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### The 'Greyhound' Convoys

The British were surprised and impressed by the staunchness of Mr. Ralph Davies and his team. In November, when the deliveries into the New York Navy Pool began, they had wondered how long they could be kept up in face of the pressure that was likely to be mounted against them. There was, British observers in Washington agreed, 'political dynamite' in the domestic fuel situation. Because of these doubts the British pinned their faith to a different arrangement which was commended to the President by the Prime Minister in the course of December. This British proposal also sought to eliminate the time-consuming voyage along the American coast, but to do so by cutting out New York entirely. Hitherto tankers had been tied to a 'two sides of a triangle' route to Europe because of their dependence on the general trade convoys which sailed to Britain

<sup>1</sup> The UGF convoys did not run after April 1943.

<sup>1</sup> See the account given in John W. Frey and H. Chandler Ide, *op. cit.*, Ch. VIII.

from North America. The British suggestion was to run convoys made up of nothing but tankers, and to route these convoys across the 'base' of the triangle direct from the Caribbean. Specifically, they proposed the establishment of two new convoy systems, one to supply Britain, and the other to supply the *Torch* area.

This notion of running all-tanker convoys was not a new one. It had been mentioned as a possibility at the time of Mr. Howard's and Commander Callaghan's visit to Britain in the summer of 1941. The obstacle in those days had been that the British had no warships to spare for escorting special tanker convoys, even though it was suggested that American warships could bring them half way across. Now, in December 1942, it was the Americans who faltered at the escort requirements. The British, for their part, were willing to see escorts pulled out of the Atlantic trade convoys, even at the cost of further opening out the HX convoy cycle with consequent loss of dry-cargo imports for Britain. They argued the case for direct convoys to *Torch* by pointing to the extravagance, from the shipping point of view, of continuing to supply North Africa from Britain; this meant that, by the time it reached its destination, the oil had travelled round three sides of a quadrilateral. Even as they argued the British took action. On 28th December a ten-knot convoy sailed from Trinidad direct for the *Torch* area under light escort. The convoy, TM.1, was out of reach of air cover when attacked by a U-boat pack and seven of its nine tankers<sup>1</sup> were sent to the bottom between 3rd and 11th January 1943.<sup>2</sup>

Meanwhile the Americans had resolved their doubts. On 3rd January came news of their decision to establish Tortank convoys composed of American 'Greyhounds' with American warships making up half the required force of escorts. By the middle of the month the first two convoys (TMF.1 and TMF.2) had sailed, under British escort, from Curaçao for the *Torch* area. On 5th February an American escorted convoy, OT.1, left Aruba for Dakar. Late in January it was agreed that the Americans should take over sole provisioning responsibility for *Torch*;<sup>3</sup> they then took over the running of all the Tortank convoys. Beginning with OT.2, which sailed on 20th February, they sent a 'Greyhound' (fourteen-knot) convoy every twenty-four days to Gibraltar, Casablanca, and the Azores; these convoys included vessels which broke away *en route* to sail independently to Dakar. With the starting of the OT convoys United

Kingdom oil stocks were relieved of the drain from *Torch*; after the turn of the year only 20,000 tons of oil was shipped in bulk from Britain to North Africa, the final bulk cargo leaving this country in the tanker *Alexandre André* on 14th February 1943. Shipments of cased petrol continued until March, primarily because of the need for cans in North West Africa, where the Allied forces had no canning plants. In all 288,000 tons of petrol was transported 'packed' from Britain to the *Torch* area after the beginning of 1943.

The second British convoy proposal, namely that of direct tanker convoys from the Caribbean to the United Kingdom, had been hanging fire during December and January. The original conception, set out in the Prime Minister's cable of 17th December, had been to establish a three-squadron system of ten-knot convoys, each squadron composed of forty tankers. But, with the institution of the New York Navy Pool, the British realised that they would not have enough ten-knot tankers to run convoys of this kind as well as to take full advantage of supplies from New York. They therefore pressed for the institution of 'Greyhound' convoys. On 26th January 1943 a British Mission led by Mr. Geoffrey Lloyd, the Secretary for Petroleum, arrived in Washington. At the discussions which followed it was agreed to introduce instead a fourteen-knot tanker convoy system from the Caribbean to Britain, using the Kurtz Plan 'Greyhounds' and other fast tankers which the Americans expected to be available in March. Subsequently Mr. Lloyd described this decision as probably the most important result of his visit. The first of these new 'Greyhound' fourteen-knot convoys, CU.1, left Curaçao, nine tankers strong, on 20th March 1943. It arrived in Britain thirteen days later. Like the OT convoys sailing to *Torch*, these CU convoys were organised by the Americans and escorted by American warships.

These measures to improve tanker handling and efficiency taken in the winter of 1942-43 were soon followed by a rise in United Kingdom oil imports. Table 25 overleaf shows how weekly average imports rose in the spring of 1943. Imports between June and November 1941 are given as a basis for comparison.

To what extent, it may be asked, were the new 'Greyhound' convoys—on which the Lloyd Mission had set such store—important to this recovery in the spring of 1943? The answer is that these convoys made relatively little direct contribution to oil supplies in North Africa and Britain during this period. Because of the shortage of fast escorts there were long delays between convoy sailings while the escorting warships were refitted. The OT 'Greyhound' squadrons eventually settled down to operate at intervals of roughly fifty-six days; but the second of the CU convoys did not sail until 22nd May—sixty-three days after CU.1. The time thus lost was not all wasted.

<sup>1</sup> *Norvik*, *Minister Wedel*, *Albert L. Ellsworth*, *Olenia II*, *British Dominion*, *British Vigilance*, and *Empire Lytton*.

<sup>2</sup> S. W. Roskill, *op. cit.*, Vol. II, pp. 356 and 407.

<sup>3</sup> From the spring of 1943 all British, American and civilian oil requirements in the *Torch* area were co-ordinated by A.F.H.Q. Algiers, which submitted a monthly 'slate' of forward requirements and previous consumption to the Army-Navy Petroleum Board in Washington.

In the intervals between convoy sailings the 'Greyhounds' continued their Kurtz Plan shuttle trips up from the Caribbean to the New York Navy Pool. But so far as direct deliveries across the Atlantic were concerned, the OT convoys were contributing 100,000 tons a month to North Africa by the spring of 1943. As for the CU convoys to Britain, these had delivered, down to the end of May 1943, no more than 130,000 tons of oil.

These arrangements for the Caribbean 'Greyhound' convoys were probably the best that could be contrived in the circumstances of

TABLE 25  
United Kingdom Oil Imports December 1941–May 1943\* (weekly average) 000 tons

	Total†	Caribbean	Gulf of Mexico‡	United States Eastern Seaboard
June–November 1941	295·9	123·2	23·8	137·6
December–February 1942	242·4	98·7	84·9	56·5
March–May 1942	157·5	55·3	59·6	36·5
June–November 1942	201·6	80·5	99·1	12·5
December–February 1943	203·3	75·6	52·6	69·3
March–May 1943	254·7	54·2	22·4	167·4

\* Based on calendar months and therefore not quite comparable with the weekly averages of consumption given in other tables.

† Includes surplus bunkers and packed imports not covered in subsequent columns.

‡ Imports from United States other than through the Shuttle. It may include some direct liftings from United States east coast.

early 1943. But in fact, so far as Britain was concerned, they turned out to be little more than a modified Kurtz Plan, adapted to meet British wishes for a more direct contribution from the fast tankers. The British accepted the inevitability of the long intervals between convoy sailings, but were more inclined to criticise the relatively slow build-up of 'Greyhound' numbers in the CU and OT convoys. Thus, the OT convoy system as a whole contained only twelve tankers down to April 1943, when the number went up to sixteen. The majority of new 'Greyhounds' which American shipbuilders were beginning to turn out in increasing numbers, were allocated for Pacific service (as the British themselves had agreed to be desirable from a tanker management point of view). But of the relatively few 'Greyhounds' that were in the Atlantic, not all were

used in the CU and OT convoys. For instance by March 1943 Americans were running a direct service of fast tankers sailing independently to supply Freetown from the Caribbean. The British did not criticise this operation which accorded with their own views of how 'Greyhounds' should be utilised. But there were also fast tankers being used to supply Iceland, whose speed was wasted on their homeward voyage since they were travelling back to New York in eight-knot convoys. Other 'Greyhounds' were employed on a two-day run carrying oil to the Panama area.

Whatever the merits of the way in which 'Greyhounds' were deployed in the Atlantic in the early part of 1943, the fact is that almost the whole burden of supplying Britain and the *Torch* area was laid on smaller tankers sailing in the ten-knot and eight-knot convoys—slow tankers which carried less oil, and whose numbers were, moreover, diminishing. For this sector of the tanker fleet contained an unusually high number of damaged tankers in the early months of 1943. The winter had been the worst on record in the North Atlantic and the incidence of marine damage to shipping was unusually high.

Thus, during the early months of 1943 it was the level of shipments from the New York Navy Pool which was the crucial factor in raising trans-Atlantic oil shipments. Without the movement of oil by rail from the southern states to New York it is doubtful whether the Allies could have maintained a sufficient flow of oil across the Atlantic in the early months of this year to sustain two war theatres in Europe. Even so, oil imports into Britain, despite their late spring spurt, remained well below what was needed to meet consumption and build up reserves. Lower at the end of 1942 than at any time since the worst days of 1941, Britain's oil stocks had fallen lower still by the beginning of June 1943.

The fact is that the increasing oil requirements for North Africa, where the Allied campaign was reaching its climax, came at an awkward time for the British. Supplies for *Torch* were carried for the most part in tankers that might otherwise have sailed in HX convoys to Britain. Even so, the size of the tanker fleet plying to Britain did not fall to any important extent during the first five months of 1943; but there were reductions in the number of tankers employed in other services, such as attendance on naval vessels and the carriage of non-petroleum products. In addition, during the critical early months of 1943, many British-controlled tankers were still committed to journeys to the Gulf and Caribbean. The British therefore found themselves short of vessels to take advantage of all the supplies being offered to Britain from the New York Navy Pool. Thus, between the middle of December and the end of January the Americans made available 876,000 tons of oil at the Pool for ship-

ment to Britain; but the British were able to take only 476,000 tons of this. In February the British lifted 105,000 tons less oil than they were offered; and their March liftings of 376,000 tons were still well below what was available to them.

Other factors which held back the increase in United Kingdom imports in the early months of 1943 were the opening out of the cycle of HX convoy sailings mentioned earlier; and the removal from New York to Halifax of the terminus of eight-knot (SC) convoys in order to ease the congestion at New York. This switch to Halifax meant the revival of coastwise convoys from Boston to Halifax for eight-knot tankers loading oil at New York and neighbouring ports; and with further convoys, of course, came further delays.

The table below shows the relatively slow build-up in the number of tankers lifting oil for Britain from the New York Navy Pool, and how this retarded the improvement of tanker performance.

TABLE 26  
*Tanker Sailings\* and Round-Voyage Times*  
(January–May 1943)

	January	February	March	April	May
Total sailings from United Kingdom	39	50	56	55	48
Average net round-voyage time	75½ days	65 days	64 days	57½ days	57 days
Sailings to New York Pool	11	26	30	42	40
Average net round-voyage time	59 days	54 days	53 days	52 days	54 days
Sailings to Gulf/Caribbean	28	24	26	13	8
Average net round-voyage time	82 days	77 days	77 days	76 days	72 days

\* From west coast ports on completion of round voyage.

## CHAPTER XV

### PREPARATION

(i)

#### Stocks and Storage

THE eighteen months after Pearl Harbour was a period of intensive preparation for the coming assault on occupied Europe, and the oil authorities were deeply involved. While grappling with current problems of shortage they were also planning the construction of facilities for handling the vastly increased flow of oil products that would arrive as the Allied Armed Forces built up their strength and began to make use of it.

A need to build new oil storage in Britain arose again in 1942 both to improve the distribution network and also because of plans for further stockbuilding. New 'distributional' storage was required to cope with increased deliveries through the west coast ports and into eastern England; and also new traffic flows in the south of the country in consequence of operations on the Continent. Additional demands for stockbuilding space arose from the need to provide adequate stock cover for rising levels of Service consumption—in particular the consumption of the United States Army and the United States Army Air Force in Britain.

In November 1942 the Oil Control Board's Storage and Development Sub-Committee was asked to approve programmes for new storage building sponsored by all four consumer departments. The Petroleum Department's request was smallest. It wanted to construct tankage at Avonmouth of a mere 12,000 tons to provide a west coast alternative to the Mersey for the reception of lubricating oil tankers. But the Department had, in fact, already received sanction earlier in the year to add 40,000 tons of capacity to the key inland installation at Aldermaston, which was so conveniently situated for supplying the Thames valley, the east midlands 'bomber area', and the south coast invasion ports. For its part the Admiralty requested approval to build 30,000 tons of partly buried storage, together with a tanker berth, at Devonport; it had already received sanction for schemes for two new 12,000 ton partly buried

installations at Harwich and Devonport completed in 1940 and 1941, and had been allowed to take over from the Petroleum Department 28,000 tons of partly buried storage at Falmouth.

The biggest demands came from the Air Ministry and the War Office which, with the backing of the Chiefs of Staff, insisted that they must hold reserve stocks of aviation spirit and motor fuel equivalent to consumption for six months ahead.<sup>1</sup> This meant that they would have to provide storage for peak stocks—the Air Ministry by mid-1944 and the War Office by the date when the invasion was launched—which between them would amount to some 850,000 tons more than the previous peak stock they had planned for. The War Office intended to hold a third of its 'strategic reserve' of motor fuel in tins. Even so, after allowing for 'working ullage',<sup>2</sup> their revised estimates meant that the Air Ministry and the War Office between them would require about 750,000 tons of additional 'clean' tankage capacity.

The Storage and Development Sub-Committee agreed to allow all projects which had distributional or strategic value to be met by new construction. Such construction was immediately put in hand. It included the civil and naval projects and the provision of some 200,000 tons of new capacity for the Air Ministry. Most of the rest was required simply for holding reserves, and this space it was hoped to find from the large amount of civil petrol tankage now lying empty because of the fall in consumption<sup>3</sup> and the changed pattern of distribution. Most of this empty storage was, of course, situated along the east and south coasts. But the old security objection to locating Service stocks in the eastern half of the country had lost its former force now that German aircraft could strike equally well at the west.

So it was that the War Office was able to satisfy nearly all its extra storage requirements from partly buried tankage in the Thames Estuary, which happened to be conveniently placed for linking into supply arrangements for a cross-Channel expedition. At the end of November 1942 the Storage and Development Sub-Committee provisionally approved the transfer of 142,000 tons capacity from civil to military use; ultimately Shell-Mex House agreed to transfer 185,000 tons. At the same time the Air Ministry was provisionally allocated 100,000 tons of civil storage, which was increased later to 157,000 tons. 51,000 tons of this was located on the Humber, within easy reach of the Yorkshire and Lincolnshire

<sup>1</sup> The War Office had reduced its required reserve to three months after the outbreak of war. It raised it to six months again in 1942.

<sup>2</sup> The unoccupied space which has to be preserved in all oil storage to provide for differences in the rates of offtake and supply.

<sup>3</sup> The oil industry kept civil petrol stocks at the equivalent of four months consumption which meant that their target level fell as a result of the 1942 economies. The total civil white oil target eventually became 1.7 million tons.

airfields. The rest was in the Thames Estuary and at installations put up earlier by the Petroleum Department in the valley of the Severn.<sup>1</sup>

This still left the Air Ministry some 222,000 tons short of what it needed to hold all the stocks it planned to have available by July 1944. There was no more civil tankage to spare,<sup>2</sup> but for a time the authorities hesitated to order new building to cover the gap; they were uncertain whether the Air Ministry's stock target would ever be reached in practice. Estimates of forward requirements for aviation spirit tended to fluctuate (the United States Army Air Force would put forward large demands and then scale them down again some weeks later). Moreover the supply situation made it uncertain whether stocks of aviation spirit—even if they were required—could ever be built up to that extent. Early in May 1943, the Storage and Development Sub-Committee gave its approval in principle. But the final decision to build the further 220,000 tons of capacity was not taken until the following August. In fact, nothing was lost by the delay, since resources for building had been fully absorbed by the earlier orders.

These Air Ministry storage building programmes, executed in the middle years of the war, were a big call on the resources of an economy stretched to the limit. Their value should not be judged, however, by looking at them simply as housing for stocks. Of the total of 450,000 tons of new tankage ultimately built, roughly 170,000 tons was concentrated at three inland storage points (Misterton, Sandy and Aldermaston) which were of growing importance from a distributional point of view. Another 190,000 tons was sited along the west coast. Two-thirds of this was at main oil ports, and principally at Avonmouth which had been inconveniently short of white oil storage. The rest was at minor ports increasingly used by tankers bringing in aviation spirit. This build-up of storage along the west coast was part of the improvement of reception facilities made necessary there by the prospect of an ever-mounting wave of oil imports over the months and years to come.

(ii)

## Ports and Transport

Tanker reception facilities on the west coast had, as it happened, become an object of renewed attention some time before the first of the new storage programmes received official sanction. In August

<sup>1</sup> See Map facing p. 213.

<sup>2</sup> The Ministry of Supply was also in occupation of 100,000 tons of civil oil tankage.

1942 a party of American tanker superintendents arrived in this country to supervise the turn-round of the increasing number of American vessels expected to arrive following Red Gap and Blue Gap. This led to a new look at port facilities, particularly in order to see whether these were equipped to handle the big 'Greyhounds' expeditiously. The Americans laid particular stress on the importance of there being enough shore steam to supplement the ships' own steam power where this was needed to enable tankers to operate their pumping equipment to maximum capacity. They also attached importance to increasing the rate at which fresh water ballast could be supplied to these larger vessels. Before the end of 1942 schemes to provide extra boiler plant on shore and additional fresh water pipelines to the tanker berths had been put in hand at all the main oil ports. At Bowling a new booster pump was installed to assist tankers to discharge there into the distant storage at Old Kilpatrick; and at Avonmouth additional pipelines and booster pumps were added to speed up the rate of discharge. At Swansea, where the shore storage was a long way from the tanker berths and the oil had to be discharged uphill, the installation of a new boiler plant, pipelines for oil and water, and booster pumps was put in hand. All these schemes, except that at Swansea, were completed during 1943.

Tanker handling capacity along the west coast was also increased by the completion, at this time, of new tanker berths whose construction had begun in 1941; these had mostly fallen well behind schedule because of labour and engineering difficulties. On the Clyde, it will be recalled, it had been decided to build two new berths at Bowling and to connect the Bowling terminal to Old Kilpatrick, terminus of the naval pipeline across the waist of Scotland.<sup>1</sup> The pipeline was finished in May 1942, the first of the berths in November, and the second in the spring of 1943. At Avonmouth a fireproof boom around two berths in the Eastern Arm of the Royal Edward Dock<sup>2</sup> was finished in the autumn of 1942; this enabled tankers carrying low-flash point cargoes to be unloaded in the deep draught berths there. This boom was built on the recommendation of the Ministry of War Transport after weeks of fruitless attempts to persuade the port authority to relax its ban on the discharging of petrol and aviation spirit in the Eastern Arm, which was a dry-cargo basin. The change had the ultimate effect of providing an extra berth for use by tankers.<sup>3</sup> In addition, in the first half of 1943, a berth in the Avonmouth oil basin that had been out of action since before the

<sup>1</sup> See Map facing p. 213.

<sup>2</sup> See p. 223.

<sup>3</sup> Two berths in the Eastern Arm had been used for high-flash point oil cargoes since 1941. The new boom enclosed one of these and another berth not hitherto used for tankers at all, but now available to handle low-flash point products. This left one of the original berths still available to handle high-flash point products alone.

war because of reconstruction work, was brought back into use. This brought the number of tanker berths available within Avonmouth harbour to seven, compared with three in 1940.

Meanwhile, on the Mersey, work on developing the Bromborough terminal as a major port was taken a stage further in the spring of 1943 with the lengthening of the coaster berth there; an additional pipeline to the Stanlow storage, eight miles away, had been laid by February 1942. Unfortunately, these Bromborough berths could only receive ocean tankers on high tides occurring two weeks out of four. It was therefore decided, in November 1942, to lay two sets of moorings out in the river where the water was deep enough to accommodate even 'Greyhounds' at all times; the moorings were to be connected with the shore by submarine pipelines. There was also provision for 'balance' tankage and yet another pipeline to Stanlow. This second phase of the Bromborough project was completed in September 1943.

These were the more useful works completed at the west coast ports in the later part of the war. Two other schemes finished at this time had been undertaken to provide emergency discharge points in case the main port approaches were blocked, and did little to increase handling capacity. One of these was the provision of berths at Finnart on Loch Long, connected by pipeline to the Clyde. Owing partly to delays in the delivery of equipment work on this was not completed until May 1944. Awkwardly placed as it was, this terminal was seldom used. Another 'insurance' scheme was the ill-conceived project for building a tidal jetty outside the harbour entrance at Avonmouth. It will be recalled that, after much tribulation, this project had been reduced, in 1941, to the laying down of moorings<sup>1</sup> which were completed in May 1943. Thus this protracted engineering project limped to completion, four years after its sanction by the Committee of Imperial Defence; and six years after it had first been put forward, as an urgent matter, by the Petroleum Department. Its story closes on a note of anti-climax for, because of their situation in the tidal river, the new moorings were hardly ever used.

In September 1943 there were twenty-six tanker berths along the west coast of Britain capable of handling tankers with the draught of 'Greyhounds'; counting the Avonmouth tidal moorings and the Loch Long berth the total number was forty-four compared with thirty-five some two years earlier. The improvement in west coast tanker handling between 1941 and 1943 is shown in Table 27 overleaf.

What did this expansion of facilities mean in terms of importing capacity? In the summer of 1943 Shell-Mex House estimated that the west coast ports were potentially capable of taking in nearly 2

<sup>1</sup> See p. 226.

million tons of oil a month (well over 450,000 tons a week.)<sup>1</sup> This was an impressive figure. But it was one which could never be realised; for it was impossible to move oil away from them at anything like this rate. In September 1943 the maximum rate of clearance, taking account of inland and coastwise movements, (and including civil bunker offtake, much of which did not have to be moved at all) was put at only 1.2 million tons a month (well under 300,000 tons a week).<sup>2</sup> But even this represented a creditable

TABLE 27

*Tanker Turn-round Times in United Kingdom West Coast Ports 1941-43*

Period of sailing from United Kingdom	Number of vessels	Average time waiting to dock and discharge	Average time discharging	Average time gas freeing and ballasting
October-December 1941	186	0.8 days	2.7 days	1.5 days
October-December 1942	154	0.75 days	2.1 days	1.0 days
October-December 1943	186	0.42 days	2.0 days	0.85 days

improvement in importing capacity. In the summer of 1941 the west coast ports had been working full out to handle a mere 165,000 tons a week. It is reasonable to assume, though it cannot be demonstrated, that transport facilities were working at full strength in late 1941. This suggests that their capacity was nearly doubled over the following two years.

There are no comparable figures available which can be used to show the extent to which each means of transport contributed to this improvement. What evidence there is suggests that movements by coaster and inland tank barge did not increase to any significant extent—if indeed they increased at all. The oil tonnage moved in bulk up the Severn valley waterway system was certainly rather greater in 1943 than in 1941, possibly because of an increased use of the South Wales oil ports. Coastal movements were always limited by a shortage of coastal tankers. The building of new ones was delayed by more urgent demands for dry-cargo coasters; and even when new vessels became available they were liable to be taken for other purposes, the shipment of edible oils for instance. Of thirteen new coastal tankers ordered by Shell-Mex House in August 1940, nine had come into service by the end of 1942; but in the meantime eight had been taken away from oil distribution. In February 1942,

<sup>1</sup> Excluding, of course, naval bases and their import facilities.

<sup>2</sup> This figure includes the movement of lubricating oil and of feedstock for the bitumen refineries (roughly 80,000 tons a month).

the coastal tanker fleet was still only seventeen vessels strong. It was decided to build it up to thirty-one vessels totalling between eighteen and nineteen thousand deadweight tons. But by September 1943, there were only twenty-four vessels, of rather over 14,000 deadweight tons, working for Shell-Mex House. This compares with twenty-nine, of 17,300 deadweight tons, which they had had at the outbreak of the war.

By contrast rail transport capacity had certainly risen. Throughout the earlier years of the war the railways bore the burden of the growing aviation spirit traffic; and the rail tank car fleet expanded accordingly. When war began Shell-Mex House had roughly 7,600 rail tank cars at its command, including 300 owned by the Air Ministry. By the end of 1943 it had about 9,000, the rise coming mainly as a result of construction orders placed by the Air Ministry in step with its expanding forecasts of consumption. By March 1941 the Air Ministry had 500 tank cars; that year it ordered 900 more and another 700 in 1942.

The achievement of the railways over these years was impressive. In 1938 they had carried roughly 250,000 tons of oil products a month. By the end of 1943 they were carrying about 350,000 tons a month despite the fact that journeys then were, on average, between two and three times as long as in 'pre-diversion' days. By this time between eleven and twelve hundred oil trains were running every month, a notable feat of organisation in face of other growing railway commitments. It was achieved by day-to-day co-operation at working level between Shell-Mex House and the railway authorities.

Road transport, which had shouldered a big part of the extra burden imposed by diversion during 1940 and 1941, also increased its lifting potential between 1941 and 1943, but again, no exact comparisons can be given. There was no increase in the number of road tankers as there was of rail tank cars. Motor vehicles were in very short supply throughout the war and new ones were very carefully allocated. Even with the full backing of the Air Ministry—which depended almost entirely on the civilian road tankers to move supplies from their Distribution Depots to airfield storage—Shell-Mex House was able to do little more than replace worn-out vehicles. This mattered little in the early part of the war. Pooling arrangements and other improvements in operating efficiency meant that the road tanker fleet was rather larger than was needed. The problem was to keep the corps of drivers sufficiently and equally employed. But it was obvious that there would be a shortage of both men and vehicles when the Allies' full bombing offensive got under way. The solution then would have to come from more intensive working of vehicles. For this more men would be needed. From the beginning of 1943 a start was made on the recruitment of extra drivers.



(iii)

## Pipelines

It will be apparent from what has been said that by the middle of 1943 there was little scope for further expansion of long-distance oil movements by coastal shipping or even by rail, and that road transport would have nothing to spare from its own task of shorter haul movements. It was through pipelines that the authorities intended to distribute the heavy extra burden of oil traffic that would come with the final assault on the enemy.

The first new pipeline of the war had been laid from Avonmouth to Walton-on-Thames in 1941, mainly as a solution to the problem of supplying the London region from the west coast. At the end of June 1942 a branch from this line was completed to connect the expanding storage at Aldermaston with the installations on each side of Southampton Water (Hamble and Fawley), which were joined at the same time by underwater pipeline.<sup>1</sup> The new line from Aldermaston could be used to pump white products to the region that had been supplied from Southampton and minor ports to the west of Southampton before the closing of the Channel to ocean tankers in mid-1940; since then those needs had been precariously met by coastwise shipments from the Bristol Channel ports in small tankers not suitable for ocean going.<sup>2</sup>

The elimination of this small coastwise movement was of course, only a secondary purpose of the new line. Its main significance was military. The cross-Channel invasion was already in the planning stage. In the spring of 1942 a working party had been set up to consider the oil aspect. This saw the installations on Southampton Water as an important supply point for the operation. In the initial phase of the assault the invaders would depend primarily on 'packed' supplies previously accumulated in Britain. Later, when deep-water ports were captured, it might be possible to ship the oil direct to France from across the Atlantic. But there would also be an intermediate phase after the Allies had secured facilities for bulk handling,<sup>3</sup> when all oil supplies would be routed through England and

<sup>1</sup> See Map facing p. 213.

<sup>2</sup> These coastwise shipments continued to meet black oil requirements along the south-west coast until the reopening of the Channel in 1944. The authorities did in fact consider laying a black oil line to take care of south coast bunker requirements when the invasion was launched. This would have had to have been laid all the way from Swansea, however, since Avonmouth could not have handled the traffic. In the spring of 1943 it was decided that it was not worth laying such a long line.

<sup>3</sup> It was proposed to use concrete storage barges, each of 180 tons capacity in the early stages as bulk storage in harbours, estuaries and inland waterways.

despatched across the Channel from the south coast ports. Indeed the absence of major oil ports on the other side of the Channel (there were none between Cherbourg and Antwerp capable of receiving ocean tankers) made it likely that this would continue to be a main supply route throughout the campaign. This raised the question of how the oil was to reach the English south coast. Direct supply by ocean tanker was obviously impracticable. Not only would the ports themselves be fully occupied with outward cross-Channel shipments, but they were likely to be under fierce air attack. On the other hand the roads and railways to their rear would be loaded with other military traffic.

It was this thinking that prompted the construction of the Aldermaston-Southampton branch line in mid-1942. It was done quickly because 1943, or even earlier, was then still a possible date for the assault. Planned to have an ultimate capacity of 120,000 tons a month the branch line would enable petrol for the Allied armies to be pumped to Southampton Water direct from Avonmouth, or even, if required, all the way from Stanlow (through the 'North-South' line).

But the most ambitious of the pipeline plants put into effect in Britain during the war was intended to meet, not military needs along the south coast, but a big new air force demand in the East Midlands. This demand, like the new storage requirements of that time, reflected the build-up of the United States Army Air Force in Britain. The new demand was calculated at 80,000 tons a month and was expected to appear in the middle of 1943. This made it impossible to contemplate meeting needs by rail movements from the west coast. Nine hundred new tank cars would have been required and there was no chance whatever of building them in time. In any case it would have been doubtful policy to demand extra west-east movements from the railways at a time when heavy north-south rail traffic would be developing if cross-Channel operations were launched in 1943. Accordingly, in August 1942, the Air Ministry suggested that an 80,000 tons-a-year pipeline should be laid from Backford, near Stanlow, eastwards for a hundred miles to the Air Force Reserve Depot at Misterton, near Doncaster. From there a line of smaller capacity would run southwards through the east midland 'bomber area' to the Depot at Sandy in Bedfordshire, feeding supplies to all the Depots *en route*.<sup>1</sup>

The Storage and Development Sub-Committee examined this scheme in August and promptly expanded it into an even more ambitious one. Briefly, their idea was to lay, in addition, a second line alongside the first from Avonmouth to Aldermaston, and to

<sup>1</sup> See Map facing p. 213.

extend this second line as far as Sandy. This would create a complete pipeline circuit for aviation spirit from Stanlow round to Avonmouth. Three main advantages were contemplated from the circuit. It would permit supplies to be pumped from the west coast into the 'bomber area' twice as quickly, if this should be necessary. It would provide a second direct link between Avonmouth and Stanlow, giving added insurance against the risk of either of these ports being disrupted by bombing. It would also improve the facilities for supplying Southampton Water in a cross-Channel invasion: this was because it was intended that the new line from Avonmouth to Aldermaston should be large enough to carry not only the 80,000 tons a month required in the 'bomber area', but also the 120,000 tons a month needed to feed the branch to Southampton. This meant that London's supplies from Avonmouth would not be affected when the Southampton line was in full operation.

Work on the new circuit pipeline was put in hand as quickly as possible. The northern and the southern arms were finished, on schedule, by the end of May 1943; the line between them across the 'bomber area' was finished two months later.

One other pipeline project remains to be considered; the extension of the English pipeline network from the south coast right across the Channel to link up directly with military pipelines moving forward behind the armies on the other side. This was by no means the principal scheme for getting oil into Continental Europe being considered in the spring of 1942. The authorities were then planning to rely in the very early stages of the assault on small shallow-draught vessels which could take supplies right into shore; the construction of thirty 'dual purpose' petrol carriers was put in hand during 1942. They also hoped to use larger tankers standing well off shore and discharging their cargoes through ship-to-shore pipelines. But the advantages of *Pluto* (Pipeline Underwater Transport of Oil) as the project was called, seemed big enough to make its feasibility worth exploring. Once laid, it was thought, an underwater pipeline would be less vulnerable than these other supply methods to enemy attack and the effect of bad weather. Dependence on vulnerable shore storages would be reduced. The number of oil-carrying vessels exposed to risk in the Channel would be lessened.

The project was a leap in the dark. Submarine pipelines were commonplace enough in ports and over short distances; but there was no precedent for laying a pipeline over such a distance and under tidal conditions with currents as strong as those in the Channel. Because of the tides and the danger from the enemy it was clear that each line would have to be laid quickly, preferably overnight and in one operation. This meant that the line would have to be made up into a continuous length before laying began. Two answers to this

technical problem were put forward. The first was to use hollow armoured cable, similar to submarine telegraph cable, which could be laid by a cable ship. The second was to use welded steel pipe which could not be laid like cable, since it would be too stiff to coil in the hold of a ship. The Petroleum Department therefore proposed that the welded steel pipe should be wound round an enormous buoyant steel drum, and laid off as the drum was towed forward by tugs; alternatively the steel pipe could be played out from a drum fitted on a Hopper barge.

The feasibility of using cable (Hais cable it was called after its originator, Mr. A. C. Hartley and the two firms, Anglo-Iranian Oil Company and Siemens Brothers and Company, which co-operated in manufacturing it) was demonstrated in December 1942 when a 2-inch Hais cable was successfully laid under the Bristol Channel from Swansea to Watermouth, near Ilfracombe. This line was brought into regular use in April 1943, both for training purposes and as a convenient means of supplying petrol to the south-west of England. Cable with a cross-section of only two inches was chosen because of the need to keep down weight; the heavier the cable, the larger the ship needed to lay it. On the other hand the smaller the cross-section, the more cables and laying operations would be needed to achieve a given rate of throughput. The Bristol Channel line achieved an average of 125 tons a day: the experience of laying it led to a decision to experiment with 3-inch cable.

Meanwhile, as an insurance against the failure of Hais, work had also gone ahead on the steel pipe (called Hamel after its two inventors Mr. H. A. Hammick and Mr. B. J. Ellis). By June 1943, a factory had been built at Tilbury to weld the 2-inch and 3-inch pipe supplied from the makers (Stewarts and Lloyds) into 4,000 foot lengths. A Hopper barge had been commissioned and an experimental steel drum, called a Conun, was ready for its trials. The first test winding of the pipe on to the drum and the first trial laying were carried out in September 1943.

In these early stages of the work on *Pluto* the co-ordinating function was carried out by the Petroleum Department. It did not find the role easy, lacking experience of working on development projects in conjunction with the Service departments. Accordingly, Mr. Geoffrey Lloyd decided to transfer responsibility for design, development and administrative work in connection with *Pluto* to the Petroleum Warfare Department which had been set up in 1940 to develop new war weapons and devices making use of petroleum. The change came into effect on 1st April 1943.

(iv)

### Priority Paraffin

One final work of preparation undertaken in the months that followed Pearl Harbour can conveniently be considered at this point. In the spring and summer of 1942 the oil authorities gave much time and thought to considering how they could best ensure that every household in Britain would have a sufficient share of paraffin and other fuels for its own domestic purposes during the years of austerity that lay ahead.

It was the coal shortage which gave the first impulse to this effort. Since July 1941, the Mines Department, under powers conferred by the Fuel and Lighting Orders, had been restricting domestic coal users to a maximum allowance. This made it necessary to prevent households transferring their demand to gas and electricity thereby sending up coal consumption at gas undertakings and power stations and giving an unfair advantage to people who had those amenities. The Mines Department, therefore, set to work on a comprehensive rationing scheme for domestic consumers which would take in all solid fuels in common use, together with gas and electricity. In March 1942, Sir William Beveridge (later Lord Beveridge) was asked to put the scheme into final shape. He decided that it would be necessary to bring paraffin and oil-fuelled central heating within its scope. It was intended that the different sources of heat and light should be covered by a scheme for interchangeable ration units. Each 'household' was to receive an allotment of 'fuel' units assessed by the Local Fuel Overseer.<sup>1</sup> This assessment would take into account the number of rooms and the extent to which they were used, the average mean temperature of the locality, and any special factors such as sickness or old age. The household would be able to 'cash' its fuel units for any of the rationed fuels in the proportions that it found most convenient.<sup>2</sup>

The Lord President's Committee accepted the Beveridge scheme on 14th April 1942, with one minor amendment. Because of the relatively small number of users, it was decided to leave oil-fired central heating outside the compass of coupon rationing and to rely

<sup>1</sup> The Local Fuel Overseers were unpaid officials appointed by local fuel trading interests at the outbreak of war and given certain powers by the Mines Department, under the Fuel and Lighting Order, to control domestic coal deliveries. The Order laid on coal merchants the duty of registering with the Overseers and empowered the latter to impose local restrictions on the delivery of coal and to deal with complaints from consumers. When the restriction of coal deliveries actually began in mid-1941, they were empowered to authorise larger deliveries to consumers if there were hardship.

<sup>2</sup> For details of the scheme, see Cmd. 6352, Fuel Rationing 1942.

on the Petroleum Board to see that its customers did not get extra supplies when other heating supplies were rationed. Shell-Mex House pressed strongly for domestic paraffin to be treated in the same way. The idea of rationing paraffin had been considered and rejected before the war because it was considered that the clerical work required to check transactions in a commodity bought and sold in such small amounts would be more trouble than it was worth. Shell-Mex House still held this view. It conceded that there was not, and could not be, the same degree of control on an individual basis over paraffin supplies as over supplies of central heating oil. But, Sir Andrew Agnew asserted, demand could be prevented from rising by controlling the sale of paraffin appliances.

The Petroleum Department accepted the need for controlling sale of appliances,<sup>1</sup> but thought that rationing would be needed as well. The function of domestic fuel rationing was to ensure that supplies were equitably distributed. To do justice between users of oil and users of other fuels the Local Fuel Overseer would need to know how much oil a consumer was using before he could assess his need for other fuels. He would know this in the case of oil central heating because the Petroleum Board would have records of what each customer was getting. But he could only know how much paraffin each of its thousands of purchasers was using if purchases were brought within the scope of his 'household' allocation of fuel units. These opinions carried enough weight to keep domestic paraffin within the Beveridge scheme.

The idea of bringing all domestic fuels into one comprehensive rationing scheme was a bold, and potentially significant, innovation. Together with the setting up of the Ministry of Fuel and Power in June 1942 (which brought responsibility for coal, gas, electricity and liquid fuels under one roof and under one Minister), it pointed the way for the first time towards the adoption of a comprehensive fuel policy. For the enforcement of an integrated consumption plan, even though confined to domestic fuel, might have encouraged a similar attitude towards supply. However, for reasons which need not detain us here,<sup>2</sup> the Government changed its mind about a comprehensive plan for domestic fuel rationing and the Beveridge scheme was put into cold storage. From this it never emerged.

Nevertheless the idea of controlling the distribution of domestic paraffin was not lost sight of. No sooner did it become finally clear that fuel rationing by coupons was a dead letter, than the Petroleum Department began to consider simpler ways of making sure that paraffin supplies were fairly shared out. It did so partly

<sup>1</sup> And asserted such control, see p. 309.

<sup>2</sup> They are discussed in W. H. B. Court, *op. cit.*, Ch. VIII.

because of the cut in paraffin deliveries to retailers in September 1942,<sup>1</sup> which meant that their supplies in the coming winter would be less than in any previous winter of the war. It acted also in the face of worsening supply prospects, which suggested that this cut might not be the last one.

The Department's main concern was how to prevent people who had money and time from visiting one shop after another and buying more than the share that was their due. It was not the first time it had grappled with this problem. Throughout the spring and summer of 1941, after the first cut in paraffin deliveries, the Petroleum Department had collaborated with Shell-Mex House in working out a scheme to register consumers and retailers. The main difficulty, it then seemed, was the registering of consumers which would have to be on a household basis. Two systems were considered: a local system utilising the local fuel registration machinery of the Mines Department; and a national system based on the marking of food ration books which were issued to heads of households. But in September 1941, after consulting the Ministry of Food, the Department had second thoughts about whether consumer registration was possible, and whether it was really necessary. Keeping track of the movements of people would not be easy. On the other hand, shortage in itself might be enough to prevent 'double-dealing', since retailers would only have sufficient paraffin to satisfy their regular customers. There was also the disadvantage that consumer registration would invite registration by everyone, and therefore, possibly, cause demand to go up.

Accordingly, in the autumn of 1941 the Petroleum Department had decided to settle for the registration of retailers, a simpler task. Later it came to the conclusion that even this was unnecessary: all that was needed was a licensing scheme, for the threat of losing his licence would be quite enough to keep a dealer in order. Power to compel all dealers in domestic paraffin to take out a licence was taken in an Order published on 24th October 1941. This came into force on 1st December.<sup>2</sup>

It had been the arguments deployed by Shell-Mex House that had led to abandonment of the registration scheme. In 1942 it repeated those arguments when asked by the Petroleum Department for a simpler scheme to confine paraffin purchasers to a single retailer. There was no need, it urged, for 'irksome regulations'. All that was required was that retailers should be told not to supply new customers, or casual customers, unless they could produce convincing evidence of need. Their natural inclination would be to give priority

<sup>1</sup> See p. 308.

<sup>2</sup> Petroleum (No. 2) Order, 1941 (S.R. & O. 1941 No. 1711).

to regular customers when supplies were short and this consideration should effectively prevent 'double dealing'.

The Petroleum Department accepted the need to give advice to retailers on their obligations to their customers. In August 1942, a circular despatched to all retailers reminded them to distribute the forthcoming 15 per cent. cut in their supplies as fairly as they could; they were also told that they were under no obligation to supply casual purchasers and they were instructed to refer new customers, or people who claimed to have increased needs, to the Local Fuel Overseer, in order to get a written authority to purchase. These Overseers, who up to that time had had nothing whatever to do with paraffin, were also circularised about their new duties.

But the Petroleum Department still felt that something more than exhortation and advice was called for. What, they wondered, was to prevent the retailer from discriminating unfairly between his regular customers? Shell-Mex House thought that favouritism here would quickly become known and resented: there would be complaints, and the offending retailer could be threatened with the loss of his licence to trade. The Department then argued that the retailer might not know enough about his customers' circumstances to identify those who really depended on paraffin; and that even if he did he would find it invidious to favour them at the expense of valued customers who needed it less. If only to take the strain off the retailer the Department thought some formal machinery was needed through which customers could claim their priority.

Accordingly, in the autumn of 1942, the Department drew up a new scheme designed to ensure that people who absolutely depended on paraffin for heat and light could always obtain supplies, even if deliveries were cut down further. The scheme was much simpler than the arrangements rejected in 1941. Paraffin users were divided into two classes: 'priority' and 'non-priority'. The members of the 'priority' class, thought to number about 700,000, could establish their right to priority by submitting a claim to the Local Fuel Overseer, who could give them a 'Priority Registration Certificate'. They would also be registered with a local retailer, and name him in their application. The certificate would entitle them to buy from the named retailer a given quantity of 'priority paraffin' every month, and all purchases would be recorded on a purchase-record card issued to the customer. Retailers were instructed to set aside enough paraffin from their monthly supplies to meet these 'priority' requirements. The remaining paraffin they were instructed to distribute 'equitably' between 'priority' and 'non-priority' customers.

The Petroleum Department was rather slow in filling in the details of this scheme; for instance it took a long time to draw up what was

called the 'yardstick'—that was to be an appropriate scale of consumption for the three purposes of heating, lighting and cooking—which the Local Fuel Overseers could use as a guide to assess the need of applicants for priority paraffin. The fact was that pressure for the scheme died away during the winter of 1942-43, which was a mild one in Britain. Deliveries to retailers, although lower than in previous winters, remained sufficient to cover demand. It was not until March 1943 that the scheme came into the forefront once more. At that time, with oil stocks still falling, the Government was considering whether to make a further cut in paraffin supplies to dealers. Shell-Mex House strongly favoured this, but insisted that the paraffin priority scheme—which it had now come round to supporting—must be introduced first. Thus urged, the Department finally put it up to the Lord President's Committee, which approved the scheme in the middle of April. It was announced to the general public on 19th May, and came into effect on the 1st August 1943.

The scheme placed an extra burden on the offices of the Local Fuel Overseers, who had to take on more staff to deal with it; and the severe shortage of paraffin which its originators had devised it to meet never actually developed. However, when they came to look back at the end of the war, the officials of the Petroleum Department thought that the scheme had been well worth while. Without it, they believed, many paraffin consumers would have suffered real hardship during the cold winter of 1944-45. In face of strong opposition from Shell-Mex House and public agitation by retailers, the Department insisted on retaining the scheme after the war was over in anticipation of the coal shortage of 1945-46. In fact, the paraffin priority scheme remained in force until 1950.

So much for the problems of supply within Britain and the Atlantic area generally in the eighteen months following Pearl Harbour. Attention must now focus on oil problems in the area most immediately affected by that event—the Far East.



## CHAPTER XVI EAST OF CAPETOWN

(i)

### The Far East: Early Calculations

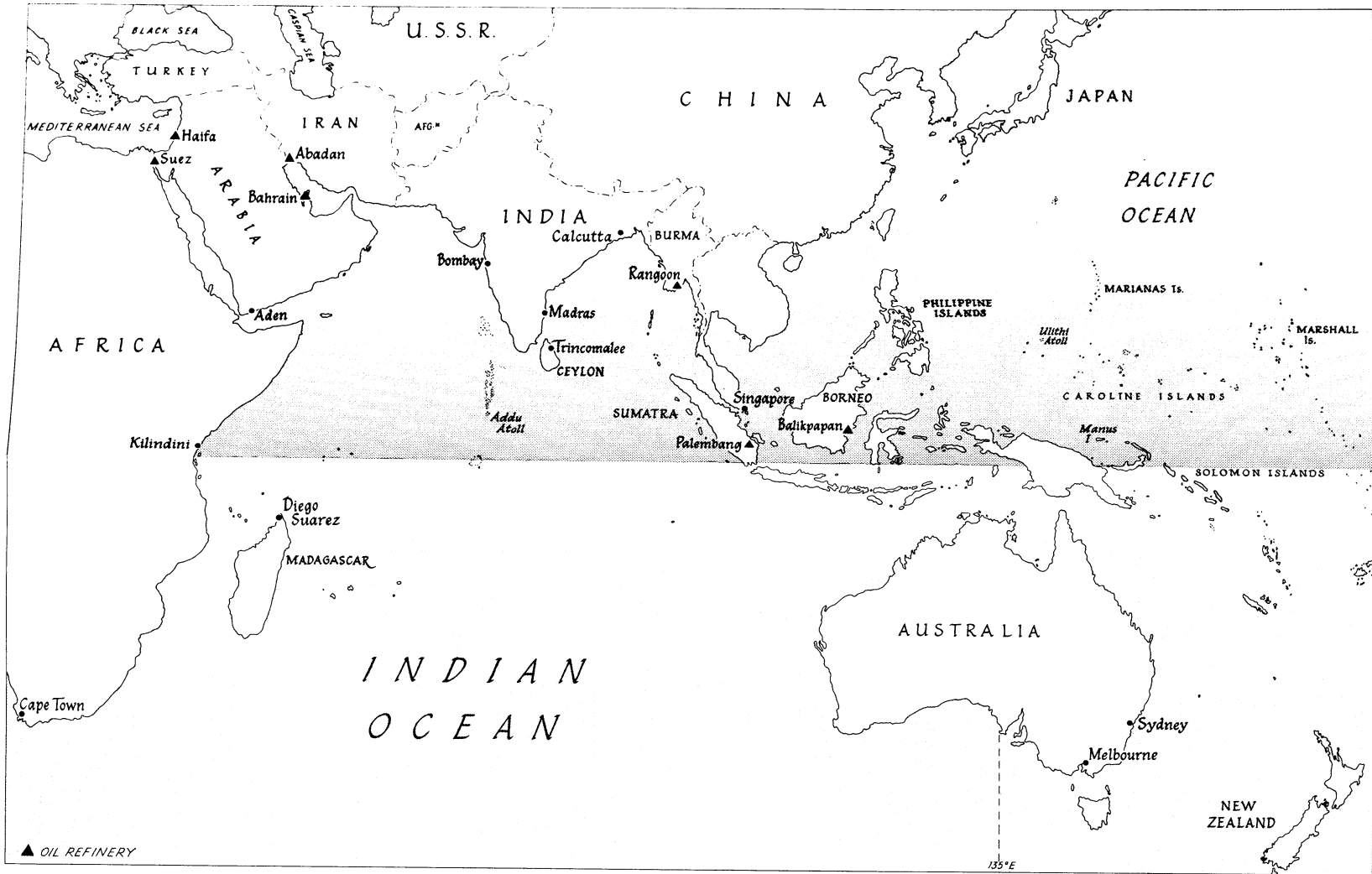
**T**HE fighting in the Far East in 1942, like the fighting in Europe in 1940 and the fighting in the Middle East in 1941, took a very different course from what had been expected before the war began. It may be of interest to recall those expectations.

The pre-war Oil Board had considered the supply implications of a war against Japan long before those of a war against Germany. It had conceived such a war as predominantly naval, with the Army and the Royal Air Force in a supporting role to protect the Singapore base, where British naval strength would be concentrated. The total oil requirements of land and air forces in the first twelve months of fighting were expected to be under 350,000 tons. It was anticipated that the Navy, by contrast, would make heavy demands. Even after allowing for unreplaced drawings from its huge oil stocks at Singapore, over 5½ million tons of Admiralty oil fuel would be needed. To set against this, bulk oil imports into Empire territories east of Suez might be reduced by economies; the Oil Board set possible savings at some 900,000 tons. This meant there would be a net extra supply commitment to the East of about 4.6 million tons.

This was for a war against Japan alone, however. Later, the Oil Board examined the hypothesis of a war against Germany and Japan combined. In that case the supply task in the East would be very much less. The strategy would be defensive with Britain's main strength concentrated in the West. Oil shipments to the Far East forces would be only 1.6 million tons in the first year of fighting.

The number of tankers required to ship these amounts was nothing like as great as would have been needed for an equal demand in Britain. Except for lubricating oil, which would be shipped in containers, all the oil could be procured from sources bordering the Indian Ocean. There were refineries close to Singapore both in Borneo and Sumatra which, in 1939, produced about 7.4 million tons

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of products. These plants were obviously of great strategic importance. However, an Admiralty ruling, first drawn up in 1926, and confirmed in 1935, laid down that supplies from Borneo could not be guaranteed in the event of war against Japan; and supplies from Sumatra only after the arrival of the main British battle-fleet at Singapore. Therefore the British Far Eastern forces planned to rely mainly<sup>1</sup> on the output of the Persian Gulf. However, no shortage of tankers was foreseen for a war against Japan alone. In a war against Germany and Japan combined the pre-war Oil Board assumed that oil would certainly be available from the United States, thus bringing the task of supplying both theatres well within Britain's tanker strength.

Only the supply of aviation spirit seemed to offer some difficulty; the Oil Board's calculations assumed that the Royal Air Force would consume 187,000 tons of 87-octane spirit in the first year of a Japanese war. Here the unreliability of the East Indies as a supply source was important, since the highly aromatic East Indies crude oils were then a principal source of high octane spirit: in the nineteen-thirties the Royal Air Force drew some four-fifths of its needs from Sumatra and Borneo. Since, in those days, no aviation spirit was manufactured at Abadan, it was planned to draw on the Burmah Oil Company's refinery at Syriam, near Rangoon. This plant, producing some 900,000 tons of products a year from the crude oil of Upper Burma, could be modified to produce spirit capable of being raised to a rating of 87-octane with the aid of tetraethyl lead. But the agreement of the Government of India, which was relying on Syriam as a source of petrol, had to be secured first. Negotiations began at the end of 1936. India had the needs of her own Air Force to provide for; but subject to these being satisfied and to certain other provisions, she agreed to make available 164,000 tons of 87-octane fuel a year for the use of the Royal Air Force. Later, in 1939, the Air Ministry pressed for a lien on the total potential output of both Syriam and another small refinery at Digboi, in Assam. The Government of India refused to agree to this, but undertook to make available to the Royal Air Force any production which was surplus to India's requirements. Work then began on the necessary modification of the Syriam plant; it was completed after the outbreak of war in Europe.

<sup>1</sup> 1.1 million tons of the naval fuel required in the Far East in a war with Japan was to be drawn from stocks in Britain.

(ii)

## East Gap

These pre-war calculations had little relevance to what actually happened after the Japanese launched their attack on 8th December 1941. Land fighting took place in the vicinity of Singapore itself until its fall on 15th February, and all arms of the British forces were heavily involved. On the other hand right down to the eve of their capture the East Indies plants continued to supply the nearby war fronts and their normal markets: (Balik Papan, site of the main refinery on Borneo, was lost on 23rd January, and Palembang, in Sumatra, on 14th February). Meanwhile the fighting spread to Burma, resulting, on 8th March 1942, in the loss of Rangoon, and later of all Burmese oil resources, and movement of the war to the frontier of India.<sup>1</sup>

These events led to a considerable increase in the demand for tanker tonnage in the Indian Ocean during 1942. There was the need to build up stocks, particularly of Admiralty oil fuel, to replace losses; over one million tons had been lost at Singapore. The Navy also needed tankers to act as floating storage because the shore tankage at some of its new bases was insufficient; between March and August 1942 ten tankers were thus allocated. There were also factors of wider and more enduring significance. As a side effect of the spread of war the demand for oil in many of the countries bordering the Indian Ocean rose, despite restrictions on civilian consumption. The loss of eastern oil resources led to changes in patterns of supply which increased the shipping effort required. Finally, there was a falling off in the carrying capacity of tankers working in the Indian Ocean as the year 1942 wore on.

Demand in countries east of Capetown, now the main port of entry into the Indian Ocean, was subject to two contrary influences in the months following Pearl Harbour. The shock of war in the Indian Ocean brought fiercer cuts on civilian consumers there than they had yet known. Both Australia and New Zealand retained their basic petrol ration: but by the middle of 1942 it had been cut to only 450 miles a year in New Zealand, and it was to remain at this level until the end of the war (with brief Christmas relaxations in 1943 and 1944). The New Zealanders also made cuts in road passenger transport and introduced a zoning scheme for goods distribution. The Australian 'basic' stayed at 1,000 miles a year, but supplementary allowances were cut. The Australian government also pressed the use

<sup>1</sup> See Map facing p. 341.

of substitute motor fuels. However in both countries petrol savings were offset to some extent by rises in the consumption of paraffin used by tractors in agriculture, and in road and airfield building in Australia.

Meanwhile on the opposite side of the Indian Ocean all three East African colonies made new petrol cuts in the first half of the year<sup>1</sup> and in February South Africa herself at last began petrol rationing. She started generously enough with a 'basic' worth 4,800 miles a year: in July this was cut by a quarter and at the end of the year it came down to 2,400 miles. In May and June the Rhodesias and Nyasaland introduced schemes with a 'basic' of 2,000 miles a year. Further north, in Egypt, the authorities (mainly to help inland transport) attempted to restrict the demand for domestic paraffin which was imported from Abadan. But the biggest economies came in India and Ceylon. The Ceylonese made progressive cuts in petrol rations after Pearl Harbour. In India there were severe cuts in domestic paraffin supplies as well as smaller petrol rations mainly, as in Egypt, to help inland transport. The Indian authorities also took special measures to regulate demand for black oils in face of expanding industrial and bunker requirements. Late in 1942 they set up Fuel Advisory Committees at each port, composed of consumer and governmental representatives, to allocate fuel and diesel oil according to a scale of priorities.

But the effect of these savings on tanker requirements was outweighed by that of new demands from the Allied Armed Forces and on the shipping that served them in the Indian Ocean region. In Australasia, notably, there was a steep increase in Service consumption as the Americans built up their strength to resist the Japanese thrust into the South-West Pacific. Sixty-five more tankers was an early estimate of the shipping impact of new military oil needs there. In India and Ceylon the military impact was less in 1942. The British and Indian force on the north-east frontier was still small and ill-equipped after the loss of Burmese oil, and its demands grew more slowly. The loss of Singapore led to a big transfer of naval offtake to the Ceylon area, where Trincomalee, now the main British base, was supported by a new naval base in the Maldives. Even so, oil imports into India and Ceylon fell from 2.1 million tons in 1941 to only 1.7 million tons in 1942. As for the Middle East, its fast rising consumption had little effect on shipping, since it was largely met from local output. But the picture was different down the east coast of Africa where the effect of petrol savings was dwarfed by a huge rise in bunker offtake, as American vessels from the western hemisphere

<sup>1</sup> Tanganyika halved her basic ration of 700 miles a year in January 1942 and Uganda introduced new restrictions in February. In June Kenya halved her basic ration and reassessed 'essential' allowances.

swelled shipping rounding the Cape to feed the new war zones in Asia and Australasia.<sup>1</sup> From nearly 900,000 tons in 1941 (itself more than twice the 1940 figure) bunker offtake from ports in South Africa rose to 1.3 million tons over 1942; and there was a similar trend further north. There was also a considerable naval offtake off east Africa in 1942 following the withdrawal of part of the British fleet to Kilindini (Mombasa) and the development of another new naval base in Madagascar (Diego Suarez).

Total seaborne requirements east of Capetown were, then, appreciably larger after Pearl Harbour than before it; and those oil requirements were, in many cases, fetched from more distant sources. The effects of distance were shown most dramatically in the Indian supply programme, which used substantially more ocean tankers in 1942 to bring in imports that were substantially smaller. The reason was the loss of Burma, which had met a large part of India's needs. Burmese supplies, carried in small tankers specially built for coastwise movement, had to be replaced by shipments from Iran carried in ocean tankers, and the sea distances from Abadan to Karachi and Bombay were far greater than from Rangoon to Calcutta.

Australia suffered even more than India from the loss of a customary import source. In place of supplies from the East Indies, Australian ports east of Melbourne had to obtain all their oil from across the Pacific, mainly from California; and those west of Melbourne obtained supplies from the Persian Gulf. Even on direct peace-time routes the difference in distance was considerable; from Melbourne to both Abadan and San Francisco is some 7,000 nautical miles whereas it is less than 4,000 nautical miles from Melbourne to Singapore. With Japanese bases strung out through South-East Asia and the South-West Pacific the sea routes actually followed were very far from direct.

The loss of the East Indies was also responsible, indirectly, for the emergence of another long oil supply route. From 1942, 100-octane spirit had to be shipped to Egypt all the way round the Cape from the Gulf of Mexico; this was because the output of Abadan, the only regional supply source left, was absorbed by growing supply commitments further east. The number of tanker loads involved was small, but the voyage was as long as from London to Singapore, so that this traffic had a noticeable effect on Middle East tanker requirements, as shown in column 5 of the table overleaf.

The third factor affecting the demand for tankers east of Capetown, was the decline in tanker carrying capacity in the Indian Ocean after Pearl Harbour. Convoys were introduced for periods even off the

<sup>1</sup> The shortage of bunkering facilities off West Africa also contributed to increase offtake at South African ports as it did at United Kingdom ports at this time. These facilities were also used by tankers delivering aviation spirit to the Middle East war theatre.

east coast of Africa and in the Arabian Sea—and with convoys, of course, came delays. Tanker turn-round times became longer, notoriously so at ports on the west coast of India, which became very congested. Repair times lengthened as well because of shortage of dry-dock facilities after the loss of so many Asian ports. To make matters worse it was mainly older vessels, considered less suitable for Atlantic service, that were used in the Indian Ocean, so that the fleet there always had more than its share of tankers needing major repairs. As time went on it became harder and harder to get big repairs done at all east of Suez, and tankers waited up to ten days before receiving even minor attention.

The effect of these factors on the demand for tanker tonnage east of Capetown is shown in the table below:

TABLE 28  
Tankers in Eastern Trades February 1942–June 1943\*  
(Vessels of 1,600 gross tons and over)

Period	000 d.w. tons				
	Total 1	Australasia 2	India and Ceylon 3	South and East Africa 4	Red Sea and Eastern Mediterranean 5
September–November 1941	1,148	456	109	419	164
February–April 1942	1,851	850	235	555	211
October–December 1942	1,941	873	265	525	278
April–June 1943	1,796	989	201	361	245

\* Excluding tankers immobilised by damage and repair, tankers engaged in fleet attendance or as depot ships, and tankers engaged in coasting or inter-coastal trade.

The table shows that the amount of tonnage working in the East grew from 1.1 million deadweight tons before Pearl Harbour—when it was at a high point—to nearly 2 million deadweight tons in the last quarter of 1942. This reinforcement was not drawn entirely from the British-controlled tanker fleet. From the end of April 1942 American military requirements, including bunkers for supply and military transport vessels, were shipped in tankers under American control; these tankers also carried certain supplies for non-American use.<sup>1</sup> There is no means of calculating exactly what this contribution meant in terms of tanker tonnage, but it seems likely that the Ameri-

<sup>1</sup> The Americans took responsibility for supplying their own needs in the Anzac area instead of transferring the necessary tanker tonnage to British control. The American tankers shipped all 100-octane spirit used in the area and all bunker oils required east of longitude 135° E. This covered all the main Australian ports east of Adelaide.

can share of the tonnage shown in column 2 of the table may have averaged about 200,000–230,000 deadweight tons between late 1942 and mid-1943. In addition, the British-controlled tonnage in these programmes contained a considerable block of American-owned vessels averaging not far short of 300,000 deadweight tons over the year 1942 as a whole. This 'East Gap' assistance, as it was named to distinguish it from American assistance tonnage in the West, was not made available in the dramatic way of Red Gap and Blue Gap assistance. The East Gap assistance included fifteen tankers, all but two flying Panamanian colours, which were working in Eastern programmes before Pearl Harbour, either in the course of normal operations, or because they had been diverted from United Kingdom trade late in 1941 to rebuild oil stocks in the East. These vessels working in the East before Pearl Harbour cannot be counted as 'reinforcements'. But they were joined, between March and May 1942, by fifteen American black oil tankers which the American authorities, under persuasion, allowed to remain in the Indian Ocean. This unplanned reinforcement was the outcome of a scheme to ship bombers for Russia to the Persian Gulf on tankers equipped with shelter-decks. These tankers were to make deliveries of bunker oil to Capetown on their way out and on their way home. After eight sailings, the bomber-carrying part of the operation was abandoned, since it was found that the aircraft sustained too much damage. But the programmed shipments to Capetown were carried out.

Of course, the greater part of the reinforcements to the eastern tanker fleet were drawn from more than half a million deadweight tons of tankers which had previously been plying to Britain under British control.<sup>1</sup> Yet even these represented American assistance in an indirect form. For the American tankers which entered British service in the Atlantic later in 1942 were, to a large extent, filling the 'West Gap' that the vessels sent East had left behind them.

(iii)

## India

The Far Eastern war increased the demand for tankers in the Indian Ocean and it also sent up the demand for land transport on the Indian sub-continent. By the middle of 1942 the Indian authorities

<sup>1</sup> See p. 283.

found themselves facing a port and transport situation not unlike that which had confronted the authorities in Britain two years before.

Their advance through Burma had brought the Japanese to the shores of the Bay of Bengal. Into the Bay at the beginning of April 1942 they sent a strong naval force, and followed this up with air attacks on Ceylon. The British fleet then withdrew to East Africa, and tankers and all other vessels bound for the east coast of India were diverted to the Indian west coast. Fortunately, this foray against Ceylon proved to be an isolated stroke. The Japanese withdrew from the western half of the Bay of Bengal and it became possible to resume oil shipments to the Indian east coast in June; however, the naval authorities allowed only one tanker at a time to move north of Madras. Later this restriction was relaxed. Nevertheless, in the following twelve months a great deal of oil consumed in the eastern half of India that would normally have been imported through Calcutta or Madras had to be discharged at Indian west coast ports and carried across country by inland transport.

In India inland transport meant the railways.<sup>1</sup> Road haulage played a minor role and there was little scope for river traffic from the west coast. Before diversion came in April, the Indian railways were carrying some 2,000 tons of oil a month all the way across the country; the immediate aim was to raise this to 16,000 tons. Circumstances were against success. India had been at war for 2½ years and the capacity of her railways was already stretched. Between April 1941 and March 1942 the Indian broad-gauge systems carried 28 per cent. more goods traffic than in 1938—and did so while releasing rolling stock for the benefit of the Middle East. When shipping diversion came the Indian railways were short of locomotives; afterwards they were short of train paths since the lines out of Bombay—the main west coast oil port—became congested with trains carrying military supplies to the Assam war front in addition to dry-cargo imports diverted from the east coast. To make matters worse there were many more trains coming in the opposite direction, bringing goods that could no longer be exported or shipped round through the east coast ports. This heavy flow of traffic caused operating delays which were multiplied as journeys continued over the enormous distances of the Indian sub-continent.

The oil authorities tried to ease the load on India's railways by cutting oil supplies to the civilian population. Paraffin was the main item of Indian demand and about two-thirds of the roughly 800,000 tons a year consumed in India was used in the eastern half of the country. Sold mainly for lighting, paraffin could to some extent be replaced by vegetable oils. In April 1942 deliveries to regions

<sup>1</sup> See Map facing p. 416.

normally fed from ports in Bengal were cut by a half, and to the rest of the country by a quarter; in June the 50 per cent. cut was made universal so far as bulk supplies were concerned; in August the 50 per cent. cut was imposed on 'packed' deliveries as well.

The authorities also limited petrol allowances to India's 120,000 motorists, about half of whose consumption was in the east. The 25 per cent. cut in normal petrol deliveries aimed at when rationing began in August 1941 had been increased to 40 per cent. on the morrow of Pearl Harbour. Now, in May 1942, the authorities sought to raise it to 50 per cent. by a reduction in the basic ration. This new cut was accompanied by a reduction in supplies for public passenger transport; goods vehicle supplies were not touched but, in April, there was an allocation of steel for the manufacture of 12,000 producer gas units.

Meantime the authorities strove to maintain and increase the flow of cross-country oil movements. To improve the handling of rail tank cars they began to run special oil trains in May 1942 between Bombay and Calcutta. They restricted rail movements of other liquid commodities such as molasses and vegetable oils to release 200 rail tank cars for the carriage of petroleum. The authorities also reverted to distributing paraffin supplies in containers, and erected additional container plants at Bombay and Karachi to reduce bulk movements of aviation fuel. They tried to get additional tank cars from the Middle East but without success, for the Middle East had none to spare.

Another resource was to make fuller use for oil distribution of the narrow-gauge railway systems which were less congested than the broad-gauge systems and not so short of tank cars. From Allahabad, in the centre of India, a narrow-gauge line ran eastwards, connecting up with the narrow-gauge railway network that lay behind the fighting front in Assam; it was common sense to use this rail line for military oil supplies. There were also narrow-gauge systems radiating from the minor west coast ports of Port Okha and Mormugao, which could be used for local distribution. An obstacle at Mormugao was the refusal of the local railway company to handle petroleum in bulk: its objections were overcome early in 1943.

These expedients enabled the Indian oil trade to live through a difficult twelve months. Between April 1942 and March 1943 total Indian imports of white oil products were 100,000 tons less than in the previous twelve months, despite rising Service consumption: but through the west coast ports alone white oil imports were 36 per cent. greater.

In the spring and summer of 1942 the oil authorities in India were not only beset with current difficulties: they were equally concerned about the longer-term outlook. Looking ahead, the biggest problem came from the new and expanding military

demands in the part of the country most remote from the west coast. It was estimated that the Forces on the north-east frontier would build up their oil consumption by an additional 12,500 tons a month by the end of 1942. In addition there were optimistic plans to deliver 10,000 tons of oil a month to China via new routes across North Burma to replace the old supply route up from Rangoon. In all, an eastern movement of nearly 50,000 tons of oil a month might have to be arranged across the Indian railway system. If the east coast ports remained closed a thousand extra tank cars would be needed. There were new cars being built in India but there was no chance of meeting a requirement of this magnitude. In any case there were neither the locomotives nor railway paths available to cope with the three extra trains a day that it was reckoned would be required in each direction.

As a minor relief to the problem, the authorities pressed the development of 'up-country' oil production. They urged the Assam Oil Company to expand its crude oil production; the company's refinery at Digboi was only fourteen miles from the railhead at Ledo through which Chinese and American forces operating in North Burma were supplied. The Indian authorities also gave financial support to a drilling programme in the Punjab aimed at bringing crude oil production there up to the full capacity of the Attock Oil Company's refinery at Rawalpindi, which was conveniently placed to supply the north-west of the country.

But in India, as elsewhere, the main plans for transport relief were pinned on the construction of pipelines. An ambitious scheme was put forward to lay a 6-inch line from Bombay to the central railway junction and river port of Allahabad; from here supplies could go by tank barge down the Ganges into Bengal, or by various rail routes diverging away from the city towards the east. This would require a thousand miles of pipe, however, which could only have come from the United States, then in the process of delivering the 760 miles of 6-inch pipe ordered in 1941 for the Middle East. To provide pipe for India would have involved an enormous supply and shipping commitment. Even if the Americans had been convinced of its merits and been immediately willing, and able, to deliver what was required, it was reckoned that the pipeline could hardly come into service before 1944. Nevertheless, this scheme was only rejected after serious consideration both in India and in London where it was examined by a high level Service committee. In its place a more modest scheme was adopted to lay a pipeline north-eastwards from Bombay to Bhusawal, the first rail junction along the main line. This pipeline would carry the oil only 276 miles—even so it was to be the longest non-military pipeline to be laid by the British during the war. But it would by-pass the most congested stretch of the

railway routes east: rail tank cars were taking an average of nine days to complete a round trip between Bhusawal and Calcutta, compared with fifteen days for the full round journey from Bombay. Work on the Bombay to Bhusawal pipeline began in the autumn of 1942 with some of the American 6-inch pipe released by the Middle East for the purpose. The pipeline came into operation, together with 20,000 tons of storage erected as balance tankage at each end, in August 1943.

It was not only the Indian railways that were strained in 1942 by the growth of oil imports through India's western coast; the west coast oil ports found themselves hard pressed by the new overland traffic to the east at a time when they were having to handle increasing quantities of bunker oils and to import fuel oil needed locally by industry (notably by the Bombay textile mills).

By the standards of ports on the Atlantic the Indian ports<sup>1</sup> were poorly equipped to handle large amounts of oil in bulk. At most of them, the same pipeline had to be used for both discharging black oils ashore and for taking on bunkers—and bunkering took priority. At Cochin, a small west coast port in the south, there were no ship-to-shore pipelines at all, and tankers had to discharge into barges, taking six days to unload a full cargo. Yet it was this port which in 1942 had to handle oil formerly discharged at Madras. At Karachi, the second largest west coast port, tanker turn-round was adequately fast; but, because of the pattern of its rail and river communications, Karachi could supply only the north-west provinces. Thus the main extra burden fell on Bombay. At Bombay, however, there was only one tanker berth where petrol or aviation fuel could be discharged. There were three black oil berths, but these were also used by vessels undergoing repairs—and Bombay was the main tanker repair port east of Suez. Consequently the three black oil berths were occupied by working tankers for only two days out of three during 1942. Even when a berth was available, tankers might have to wait for twelve hours or more after arrival before going alongside, since berthing was forbidden during darkness.

If Indian rail communications had been better these inadequacies of the west coast ports would have been the limiting factor on west coast oil imports in the second half of 1942; as it was they wasted tanker capacity at a time when this was in conspicuously short supply. Towards the end of the year an Anglo-American Shipping Mission began a tour of Indian Ocean ports to see what could be done to improve their tanker handling ability. The Mission visited the Indian west coast and recommended substantial modernisation schemes with equipment ordered from the United States. For

<sup>1</sup> See Map facing p. 466.

instance it suggested that all the west coast ports should receive new 12-inch pipelines and booster pumps; and that new berths should be built at Ernakulam, adjacent to Cochin, and also at Bombay. But little came of all these suggestions. The new berths would have had to be connected with installations on land by long submarine pipelines; and in 1943 it became apparent that there was little likelihood of getting these laid because of scarcity of materials and labour. As for the booster pumps and pipelines, these were slow in coming forward from America. Bombay, the first port to get them, was still in the process of installation when the war ended.

More effective results were achieved through the initiative of the local oil companies themselves. These embarked on a reorganisation combined with such modest improvements as could be contrived from materials to hand. At Karachi, antiquated bunkering lines were replaced and extended from equipment of local manufacture. At Bombay disused and seldom used lines were brought into full service, and a separate bunkering pipeline was installed. At all ports the rate of discharge was increased by connecting up facilities owned by different companies. At Cochin the discharge barges carrying black and white oils were pooled when this was possible without contamination. Late in the day, in November 1943, a damaged 5,000 ton tanker was installed at Cochin as floating storage to permit bunker oil to be handled by pipeline. At Bombay a new water main and pump were installed at the white oil jetty; this reduced the time taken to clear the ship-to-shore lines with water after discharge had been completed. Berthing at night continued to be forbidden but in good weather tankers were allowed to 'double bank'—that is to lie two abreast at the berth. Finally, permission was given to discharge petrol in Bombay's black oil dock and the number of berths available to tankers there was increased; this meant that two berths were always free for tankers discharging oil.

(iv)

### North Africa

India was not the only eastern territory facing oil transport problems in 1942 and 1943. In the Middle East also rising consumption put a strain on a distribution system only recently converted to 'bulk' handling and therefore with little spare capacity for extra traffic.

In North Africa fighting continued with mounting intensity down to the spring of 1943, and military oil demands increased correspondingly. Between July 1942 and June 1943 roughly three-quarters of a million tons of oil products were delivered to the Forces in the Western Desert. From the Battle of Alamein in October 1942 to the final victory in Tunisia the following May deliveries averaged 100,000 tons a month, rising to a peak of 140,000 tons over April 1943.

These needs of the Desert forces however, created virtually no new bulk transport problem. In 1942, as in 1941, their supplies were shipped direct to Alexandria, and sent forward, either in smaller tankers direct to Cyrenaican ports, or else in containers by road and rail. Unhappily, the 4-gallon 'tin' or 'flimsy', so roundly condemned the previous year, remained the commonest type of container in use. With the arrival of the tin-making plants ordered from Britain in 1940 and 1941, the output of 'flimsies' in the twelve months beginning August 1942 was more than 2½ times greater than two years earlier. Meanwhile the supply of the eagerly awaited steel containers—the Jerricans and their American equivalents—fell behind schedule. None of the plants ordered from the United States and Britain reached the Middle East in time to begin production while the fighting was still going on. The first new Jerrican plant came into operation in North Africa in August 1943. Meanwhile, in desperation, the authorities had placed orders in the United States for finished steel cans. But these could be shipped only at a rate never more than 50,000 a month and their shipment occupied precious cargo space. In these circumstances the capture of about 1½ million Jerricans in the advance from El Alamein (as well as half a million steel barrels) was regarded as immensely valuable war booty.<sup>1</sup>

Supplies of 18-gauge steel barrels used for aviation spirit also fell short of requirements. Indeed in March 1943 there were fears that the Royal Air Force in Libya might be grounded because of this. The new barrel plants ordered from Britain and America did not come into production until the spring of 1943. Efforts to fill the gap were made from materials at hand. Components collected from all over the Middle East were used to assemble a plant at Haifa, which came into production at the start of 1943. Another barrel-making plant was brought all the way from Takoradi, Nigeria, and came into production at Suez in the spring of 1943.

A notable but ultimately abortive scheme to assist the supply of the Desert forces must be mentioned in passing. In the summer of 1942, when the British front line lay deep in Libya, the tankers carrying oil from Alexandria to Tobruk began to suffer losses. It was therefore

<sup>1</sup> *The Story of the Royal Army Service Corps 1939-45*, p. 485 (G Bell & Sons Ltd., 1955).

decided to connect these two ports by a 6-inch pipeline. As a first stage it was intended to lay the line eastwards from Tobruk to the Egyptian frontier and bridge the gap to Alexandria by railborne movements, using tank cars withdrawn from Egyptian civil traffic. Before work on the pipeline could begin, however, Tobruk was captured and the Allied forces were driven far back into Egypt. It was then decided to lay the line westwards from Alexandria, and, as an additional refinement, to lay an 8-inch line over the first ten miles of the route, erecting 12,000 tons of new tankage at its terminus, El Amiriya; this was the point where the Cairo-Alexandria road made a T-junction with the road to the Western Desert, and was the focus of a number of military camps and airfields.<sup>1</sup> In the end, events moved too rapidly for the scheme. The line to El Amiriya was not finished until August 1943 and by then, of course, the fighting was over. The pipeline to the Desert was never laid.

The bulk oil supply problem that did arise in North Africa after 1941 was a consequence of rising needs within Egypt itself. Apart from the demands of the Allied forces in the Canal Zone and elsewhere—these consumed some 220,000 to 250,000 tons in the twelve months beginning August 1942—there was a rapidly expanding civilian demand. This arose in large part as the result of a decision to save shipping space by running the Egyptian railways on fuel oil instead of British coal. In the spring of 1940 the Egyptian railways began a programme to convert a quarter of their main line locomotives into oil burners and, in March 1942, this programme was enlarged to include all locomotives suitable for conversion. The conversions, completed by the end of 1943, ultimately raised Egyptian fuel oil consumption by some 360,000 tons a year; but they saved an estimated 400,000 tons of dry-cargo shipping space a year that would have been needed to haul coal from Britain.<sup>2</sup>

There was also a growing demand for paraffin in Egypt. This was partly a natural consequence of the rising population and partly a reflection of the heavy demands of hotels and restaurants catering for the influx of Allied servicemen. The authorities did what they could to check it. In 1941 a coupon rationing scheme was introduced. It was not altogether successful; one result of introducing coupons was to convert some sales into black market operations with the consumer paying a higher price in consequence. When the Egyptian government introduced closer control over sales in 1942, the coupons themselves became the subject of black market dealings. The scheme checked consumption simply because forged or illicitly acquired

coupons were expensive. In the twelve months October 1942 to September 1943 Egyptian paraffin consumption was some 230,000 tons; in 1944 the figure was over 360,000 tons.

Handling these growing requirements placed a strain on oil facilities—though not, in Egypt, at the ports of entry. Much of the extra fuel oil required was produced within Egypt itself. Although Alexandria now functioned as a civil port only so far as necessary to meet local needs,<sup>1</sup> the increased paraffin imports were well within the handling capacity of Suez, enlarged as it had been by the tanker berths and storage completed by the British in 1941.<sup>2</sup> However as a precaution against damage to Suez (or the blocking of the Suez Canal) storage tanks were erected in 1942 at Port Safaga on the Gulf of Suez. Oil discharged there could have been carried by metre-gauge railway to Qena, three hundred miles south of Cairo on the main Egyptian transport system.

It was on the Egyptian railways that difficulties showed themselves. Petrol apart, all civilian oil movements within Egypt were railborne; and even in peace-time the Egyptian railways had always been short of tank waggons between March and August (the agricultural season in Upper Egypt), when oil traffic reached a peak because of the fuel needs of oil-driven irrigation plants. After war broke out many of these tank waggons were withdrawn, mainly to carry water in the Western Desert, and this meant that there was a shortage all the year round. To make matters worse much of the Egyptian tank car fleet was old and in poor condition, and vehicles were frequently out of action. Repairs took longer now that Alexandria, where the workshops were situated, was no longer the terminus of most waggon journeys.

Efforts to reduce the tank car shortage began in the middle of 1940. Additional waggons were imported by the military and by the railway company, who pooled the use of these vehicles. Egypt constructed new ones herself and converted other types of waggons into oil carriers. By the autumn of 1941 the Egyptian State Railways had eleven hundred tank cars—with a total capacity of just under 13,000 tons of oil at their command as compared with five hundred tank cars at the start of the war; by the autumn of 1942 the capacity of their fleet had risen to well over 16,000 tons. The efficiency with which tank cars were used also grew. Special oil trains were introduced during the irrigation season of 1941 for delivering supplies to Upper Egypt. In the spring of 1942 these oil trains were made general throughout the country. Later that year oil trains, whether loaded

<sup>1</sup> See Map facing p. 229.

<sup>2</sup> The ships that brought the coal from Britain in 1941 and 1942 were able to carry military vehicles on their decks; nevertheless the traffic could not be allowed to continue in face of the shortage of British shipping space—and of British coal.

<sup>1</sup> In 1938 (when, of course, most imported white oils came from Roumania) some 290,000 tons of paraffin and 35,000 tons of petrol was imported through Alexandria. By the spring of 1943 only 72,000 tons of paraffin was coming in through that port.

<sup>2</sup> See p. 234.

or empty, were given traffic priority over all others, even over troop trains—except those directly serving military operations. Meanwhile, the turn-round time of tank cars at Suez was reduced by concentrating all loading on the main Shell yards, and by installing lights to permit night working. These measures had their effect. In the autumn of 1941 tank waggons took  $7\frac{1}{2}$  days on an average to complete a round journey; by the beginning of 1943 they were taking only 6.3 days. Railborne dispatches for civilian consumption, from a daily average of 1,600 tons between September 1941 and February 1942, rose to over 2,000 tons a day during the first half of 1943; and deliveries for the Army reached 500 tons a day.

These improvements did not come fast enough, however, to keep pace with mounting oil traffic on the railways. In April 1941 the authorities reckoned that they were short of some 2,775 tons of tank car capacity; by November the deficit had risen to 6,890 tons. Paraffin supplies to the civilian population were only maintained during the peak traffic season by using Army tank lorries to carry it by road to Cairo, and civilian demand for railborne supplies was expected to reach 3,000 tons a day by the middle of 1943.

Accordingly, during 1942 and 1943 a number of pipelines were laid to strengthen weak points in the Egyptian distribution network. To save road tankers a small group of pipelines was laid from the tanker terminal at Fanara to carry aviation spirit to nearby airfields on the shores of the Great and Little Bitter Lakes; this work was completed in May 1943. To supply petrol to the numerous military camps north of the Ismailia–Cairo road, the Army connected their own pipeline system between Fanara and Suez to some new partly buried storage which they had erected at Nefisha. This reduced oil traffic on the railway between Suez and Ismailia which was particularly congested since it carried traffic for Cairo, for the Western Desert and for Palestine as well.<sup>1</sup>

Black oil distribution was also improved. At Alexandria a small pipeline was built in 1943 to connect the ocean storage at Gabbary with a new railway fuelling depot on the Mahmoudieh Canal; from here it was possible to distribute fuel oil by barge throughout the Nile Delta. Arrangements were also made to supply fuel oil to the railways at Ismailia and Cairo without making any call on rail or road transport. As a fuelling depot for Ismailia, the railway company erected 30,000 tons of storage capacity at nearby Nefisha, which was connected to a new black oil tanker terminal on Lake Timsah. From Nefisha the oil could be carried by barge to Cairo. The pipeline which the Navy had laid—but had never had to use—between Port Said and Suez was also brought into service to help in distribu-

tion of oil to the railways; it was connected by a pipeline spur to the depot at Nefisha. Unfortunately, owing to the high viscosity of Egyptian fuel oils, it proved impossible to pump supplies from the Suez refinery up the pipeline to Nefisha. Instead Nefisha had to be fed with naval fuel oil from Haifa pumped down the line from Port Said. The Haifa oil was more expensive and the Egyptians were at first reluctant to accept it. However, the new arrangement was in full operation by the spring of 1943.

(v)

### Iraq and Iran

Eastwards of Egypt, in the countries exposed to attack from the north, active fighting never developed; consequently the oil demands of the Allied forces in these countries remained comparatively low. But even in these countries, the middle years of the war saw a big rise in civilian demand for oil. The railways in Syria and Palestine began to convert to oil in 1942. The coal shortage at the same time forced their industrial users to go over to oil. In both Syria and Palestine the authorities also actively encouraged the use of domestic paraffin. The Palestine government, for instance, sponsored the marketing of a cheap paraffin stove which found a ready acceptance in the villages and even among the desert nomads. In the refineries of Haifa and Tripoli these countries had local sources of oil supply—and distribution presented little difficulty.

Further to the east, in Iraq and Iran, oil was already the main industrial fuel. In both these countries increases in civil requirements were due mainly to 'Aid to Russia' traffic, which required motor fuel for road transport and fuel oil for the railways. In Iraq the problem of 1942 was to provide additional fuel oil for rail and river traffic in the vicinity of Basra and Baghdad.

To meet the demand at Basra normal tank barge deliveries up the Shatt-al-Arab from Abadan were simply stepped up; and a short pipeline was laid across the city to connect the barge depot at Muftieh with the railway depot at Margil. Later it became necessary to deliver the railway fuel oil to Basra by pipeline. This was because the tank barges were increasingly to carry bunkers for dry-cargo ships delivering supplies for Russia at Basra and Bandar Shahpur—thereby shortening their turn-round time by eliminating the need

<sup>1</sup> See Map facing p. 229.



to call at Abadan. A 6-inch fuel oil pipeline was therefore laid from Abadan to both barge and railway fuelling depots at Basra, and continued on up the railway to Shaiba, where another railway fuelling depot was installed.<sup>1</sup>

New arrangements to deliver railway fuel oil also had to be made in the Baghdad area. The city was normally supplied with oil by rail from the Alwand refinery. But the railway from Alwand to Baghdad now formed part of the supply route to Russia for goods brought in through Basra. A decision was accordingly taken to relieve it of all oil traffic. For technical reasons it was not possible to lay a fuel oil pipeline to Baghdad from the refinery. Instead the surplus capacity of the main 12-inch trans-desert pipeline from Kirkuk to Tripoli (then carrying crude oil only to meet the needs of the small Tripoli plant) was brought into use.<sup>2</sup> Fuel oil produced at the Kirkuk 'topping' plant<sup>3</sup> was pumped westwards to Baiji, where the pipeline crossed the main standard-gauge railway running down to Baghdad from the north. The fuel oil was then carried down this railway to the western suburbs of the city. A new ten-mile-long pipeline was laid across Baghdad to the terminus of the metre-gauge railway in the eastern suburbs. The 6-inch American pipe was utilised both for this link and for the Abadan-Shaiba pipeline. Both lines were completed in 1943.

In Iran, by contrast, there was no further development. Contrary to expectations the Russians were able to meet part of the oil requirements of their own zone in the north from Soviet sources, so that oil movements up from the south never reached the level that at one time seemed likely. In the British zone, after the completion of the two pipelines from Ahwaz to Andimeshk in the spring of 1942,<sup>4</sup> the main supply problem lay north of Andimeshk. For a time the authorities thought of extending the pipelines northwards. However, the laying of a fuel oil line was rejected on technical grounds; it was not thought feasible to pump fuel oil over the high ground beyond Andimeshk in cold weather. A more promising proposal to lay a 240-mile-long white oil line was abandoned when the 6-inch pipe was pre-empted to link Bombay and Bhusawal in India.

Thus, oil continued to go north of Andimeshk by road and rail. To cope with the increasing demands by 'Aid to Russia' traffic bulk oil vehicles were imported into Iran. In the autumn of 1941 there had been only 110 tank cars all told on the Iranian railways; by the spring of 1943 there were 400. The number of tank lorries in Iran rose in the same period from 260 to 500.

<sup>1</sup> See Map facing p. 229.

<sup>2</sup> See *ibid.*

<sup>3</sup> See p. 238.

<sup>4</sup> See p. 239.

The middle of 1943 was a turning point for the war effort in the East. It saw the end of active fighting in the Middle East and the beginning of a big expansion in the scale of operations in the Indian theatre. How this affected oil supply will be described in a later chapter.<sup>1</sup> Meanwhile it will be helpful to look again at the world-wide supply picture and the state of Anglo-American collaboration in oil matters eighteen months after Pearl Harbour.

<sup>1</sup> See Chapter XXI.

PART V

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The Approach to Victory

1943-45

## CHAPTER XVII

### BRITISH AND AMERICANS

(i)

#### Towards a Combined Oil Programme

**N**INETEEN FORTY-THREE was a fruitful period for Anglo-American oil relations. Combined programming began and the foundations were laid for new combined machinery to manage tanker tonnage.

It was the British who took the initiative in pressing for a combined Anglo-American approach to the allocation of tanker tonnage. They did so for the reason that had led them to foster a 'combined' approach to the allocation of 100-octane spirit. They foresaw that unless procedures were introduced for assessing priorities in an objective way their own requirements might take second place to the requirements of the American armed forces when it came to dividing up American-owned tonnage.

In the early months of 1942 the British had hoped to see this approach develop under the auspices of the Combined Shipping Adjustment Board. If shipping resources were 'deemed to be pooled' it followed that the two countries should together determine an order of priorities and allocate their tankers accordingly, regardless of flag, ownership or 'control'. In line with this conception the British made their initial request for the Red Gap tonnage through the London branch of the Board.

In fact, for reasons that need not detain us, the Combined Shipping Adjustment Board did not develop any role for itself relative to tankers. During 1942 all the American tonnage made available to Britain was allocated through the process of *ad hoc* inter-governmental exchanges that had been developed in 1941 before America's entry into the war. The *ad hoc* exchanges system served the British very well. Through Red Gap and Blue Gap assistance the Office of Petroleum Co-ordinator gave tangible evidence of his anxious concern for the level of oil stocks in the United Kingdom. But Blue Gap marked a turning point. With it the last tankers that could be spared from western hemisphere civil trades entered war service;

and the Petroleum Co-ordinator lost his ability to influence tanker distribution. Further tankers for 'British programme' trades would have to come from newly-built tonnage, and be obtained from the War Shipping Administration in Washington in the face of rival bids from the American Services. The War Shipping Administration was thought by the British to lack 'inward conviction' of Britain's needs. The American shipping agency had received some highly critical comment on Britain's use of tankers to build up domestic stocks from the Special Naval Observer posted to London in the summer of 1941 to represent the United States Navy Department and United States Maritime Commission; and, the British noted, the agency had held out against the transfer of the Red Gap tonnage to the British until the 'tanker standstill' in April 1942 had demonstrated, in the most direct possible way, that holding adequate domestic reserves was a practical precaution against a very real threat. On the other hand, in Captain (later Rear-Admiral) A. F. Carter, Secretary of the United States Army-Navy Petroleum Board, the British found another good friend and it was largely due to him that Blue Gap was implemented in full. But behind and above Captain Carter stood a naval establishment whose major concern was with American spheres of supply responsibility, and particularly with the Pacific.

For this reason the British never advocated the creation of formal combined machinery for tonnage allocation; they believed they could obtain more tankers if they argued their case in a more informal setting. What they sought with increasing urgency was more information about how the Americans were using the tankers then working in the American supply programmes and, in particular, about the size and degree of urgency of oil requirements in the Pacific and other United States-controlled areas. As the Secretary for Petroleum later wrote to the British Chiefs of Staff, the needs of the United Kingdom could 'not be assessed accurately as against other needs unless both the American and British authorities have a programme setting out the combined requirements of oil and tankers'. Late in October 1942 the British suggested that the Americans should produce a programme similar to the oil and tonnage programmes regularly prepared for Britain's Oil Control Board, but covering American spheres of responsibility.

In the Office of Petroleum Co-ordinator the advantages of effective combined programming were of course as well understood as in the Petroleum Department. For much of 1942 the Office had been trying to produce a programme that could be married with British programmes. But it had found itself up against the very same obstacle that had so hampered the French 'Direction des Carburants' earlier in the war: the reluctance of military authorities to disclose

to their civilian counterparts any information from which the course of future war operations could be inferred. In the United States this problem was enhanced by rivalries between the civilian departments themselves. The Office of Petroleum Co-ordinator sought to break down these barriers by creating inter-departmental committees on British lines. In May 1942 the Office had set up a Supply and Distribution Board under Mr. Ralph K. Davies, with functions comparable to those of the Oil Control Board's Executive Committee. Eight months later the Office of Petroleum Co-ordinator sought to more closely match the Oil Control Board with a new supreme American policy-making body called the Petroleum Board; this had the Deputy Petroleum Co-ordinator, Mr. Davies, as its Chairman and members to sit under him were drawn from every United States agency which had any concern with petroleum. Representatives of the Navy and War Departments attended the Board's meetings, and also representatives from the War Shipping Administration. But the military representatives remained unwilling to speak openly before the Board's other civilian members. As a result, when the Office of Petroleum Co-ordinator did produce a model of an oil and tanker programme at the end of 1942, it could only show United States Service requirements at home and abroad 'en bloc' instead of by areas. This meant that the number of tankers needed to meet these requirements was not, and could not be, accurately assessed. Service requirements and shipments were the province of the Army-Navy Petroleum Board and the United States Navy which operated the tankers. Moreover, the figures of tonnage available were unreliable and on a different basis from those being used by the War Shipping Administration.

In an effort to break the deadlock and get a start on combined programming the Secretary for Petroleum, Mr. Geoffrey Lloyd, decided, early in 1943, to take a team of British officials to Washington. From the discussion of 'certain outstanding practical problems' (supply responsibility for the North African theatre, the New York Navy Pool, the Caribbean Area Petroleum Committees and the fast tanker squadron from the West Indies), he wrote to the Prime Minister, there would 'naturally arise the wider question of closer co-operation between the two countries on oil and tanker programmes. I hope so to guide the discussions', Mr. Lloyd went on, 'that we may in due course get a continuous review of the United Nations' requirements and supplies such as the Oil Control Board already prepares for the United Kingdom and overseas theatres under our responsibility'.

The Lloyd Mission arrived in Washington in January 1943 and held ten meetings with the Supply and Distribution Board under Mr. Davies. It got little from these meetings except direct experience of

the depth of inter-agency distrust in the United States Administration; nothing but generalities were exchanged at these formal gatherings. More progress was made in separate discussions with individual agencies, and the Mission returned to London in hopeful mood. From his vantage post in Washington, Mr. Wilkinson was less sanguine. He expected 'neither immediate nor substantial results'; and he proved to be right. Three months later combined programming looked as far off as ever. 'The United States Navy', Mr. Lloyd minuted the Prime Minister early in May 1943, 'are still diverting fast tankers to the Pacific for requirements about which we are ignorant'. At the end of May a senior member of the Petroleum Department was writing of continuing evidence of non-co-operation between Service and civil agencies in Washington and of the failure to produce a joint supply and tanker programme 'because of this unwillingness' to co-operate.

Nevertheless May 1943 did see one important step forward. At the Washington Conference (*Trident*), the Combined Chiefs of Staff took a number of decisions about the future pattern of Allied operations. Prompted by the Minister of War Transport, the British immediately took the opportunity to propose an examination of the oil and tanker implications of those decisions. The Combined Chiefs of Staff thereupon directed their Combined Administrative Committee 'to examine and report . . .' in consultation with 'appropriate United States and British oil and shipping authorities' 'on the oil position of the United Nations with particular reference to stocks in the different theatres and to the tanker situation'.

By their acceptance of the British suggestion the American military representatives showed two things; that they were fully aware of the need for combined programming; and that they were ready to participate in this on equal terms with the British. Their next step was to acknowledge that a purely Service body like the Combined Chiefs of Staff Combined Administrative Committee could not, given the British organisation, deal with the whole oil supply picture outside the western hemisphere. On 15th June 1943 the Americans proposed the creation of a new permanent combined body, on which British, though not American, civilians might sit, to take over the *Trident* investigations and any other inquiries set on foot in future. To be called the Combined Petroleum Board, this body was to be composed of four representatives of the Army-Navy Petroleum Board, and the same number of 'appropriate' British representatives. The function of the Combined Petroleum Board would be to 'make studies and submit recommendations to the Combined Chiefs of Staff on matters concerning petroleum and petroleum products which are of combined United States-United Kingdom interest in the prosecution of the war'. These studies, the Americans said, would flow either

from references by the Combined Chiefs of Staff or from the initiative of the new Board itself. 'Except as initiated by the Combined Chiefs' the Board would not 'supplant or interfere with the functions' of any United States Service or 'similar' British government agency. Complete agreement on all matters was not to be expected and disagreements would be submitted to the Combined Chiefs of Staff.

Thus, British pressure for a more complete pooling of information had led to American counter-pressure for new combined machinery. This was logical but just what the British had been hoping to avoid. Since Pearl Harbour it had been a cardinal aim of their policy to prevent the crucial function of allocation of supplies from falling within the compass of the Combined Chiefs of Staff organisation in Washington. The British had regarded this possibility as tantamount to putting the whole British civilian supply programme at the mercy of the American military establishment. The British noted with suspicion the vague terms of reference of the proposed new Board. The matters of 'combined United States-United Kingdom interest' on which the Board would be making 'recommendations' could be interpreted to include, as the British in Washington pointed out, 'what is at present within civilian authority in London and either civilian in this country or the subject of dispute between military and civilian agencies'. Indeed in London it was suspected that the Americans wished to interpret it in this way. These suspicions were heightened by the fact that the proposal for the new Board had followed an earlier American suggestion to set up combined machinery on the tanker side, which—dangerously and inappropriately as the British thought—would also have had the function of supply allocation.<sup>1</sup>

On 23rd June the Oil Control Board held a special meeting without its American members, to discuss the United States proposal. Five days later the British Chiefs replied in terms which amounted to a rejection. They remarked that the Combined Chiefs of Staff organisation was properly concerned with military oil requirements; but that these were no more than half of total Allied oil requirements. They pointed out that the task of supply was a 'complex and highly specialised one, in which more than military considerations were involved'; this, they said pointedly, was why the British oil administration contained both Service and civilian elements. The British thought that there was already machinery available to give the Combined Chiefs of Staff all the information they needed; and argued that the appointment of a new Board would only 'complicate and hamper' its working.

The Americans did not press their proposal any further. Instead they accepted what appeared to be a compromise but which, in

<sup>1</sup> See p. 372.

fact, gave the British the substance of what they wanted; namely, an exchange of information through *ad hoc* bodies. This was to do no more than put a gloss of formality on the informal working relationship of Mr. Wilkinson, Captain Carter and the head of the War Shipping Administration's Tanker Division, Mr. Brewster Jennings. In June 1943 the inquiry into the implications of the *Trident* decisions was referred to a combined *ad hoc* Service body into which Mr. Wilkinson was brought in his role of oil and tanker adviser to the British Planning Staff. In July the Combined Chiefs of Staff agreed informally to refer future petroleum questions coming within their cognisance to an *ad hoc* committee of the Army-Navy Petroleum Board and British representatives for 'study and report'. The plan for a permanent Combined Petroleum Board, with its 'attendant dangers', cabled Mr. Wilkinson in the middle of that month, had been 'successfully spiked'.

In the next few weeks the British made steady progress towards their goal of combined programming. The first stage of the road—the co-ordination of American and British Service requirements—was travelled by the *ad hoc* committee on the *Trident* decisions. Its British members worked towards getting the American figures produced in a form which would allow them to fit in with the figures in the British oil programmes. At the same time they steered the committee away from considering civilian requirements, insisting that it should look on its work 'simply as a stepping stone to getting the information into the civilian machine'. Even so, that work continued into the autumn. The earlier reticence of the American Services, it now appeared, had been, at least in part, a cloak for ignorance. 'The chaos existing . . . with regard to these figures has been appalling', cabled Mr. Wilkinson. Starting to formulate their needs almost from scratch the American side had a great deal to do. The committee did not report until October 1943 by which time the *Trident* decisions had been replaced by revised plans drawn up at the *Quadrant* Conference of August 1943. The Combined Chiefs of Staff accordingly instructed the *ad hoc* committee to revise its findings to take account of this.

Meanwhile the American civilian authorities had not been idle. In June 1943, the Petroleum Administration for War had set up a special programming division. Throughout the weeks that the *ad hoc* committee was sitting, the division was drawing up a comprehensive supply programme for the western hemisphere, into which it incorporated United States Service figures revealed to it (largely at British insistence) through the Caribbean Area Petroleum Committee. The Petroleum Administration for War then made a supreme bid to persuade the American Services to give them detailed information about their requirements in other parts of the world. In June

Mr. Ickes and Mr. Davies discussed the matter personally with the head of the Army-Navy Petroleum Board, General Somervell, and the Under Secretary for War—with results described as 'entirely inconclusive'. Eventually, in July, General Somervell agreed to disclose Service requirements by area of shipment, but not by destination. This did not satisfy the Petroleum Administration for War, since this information would not reveal the tonnage implications of supply, which must finally determine where the oil should be produced. Mr. Ickes then wrote to the Chairman of the American Chiefs of Staff. As a result of this the Chiefs agreed in September to reveal their oil needs on an area basis. Early in October the *ad hoc* committee working on United States Service requirements was instructed to 'work in collaboration with the civilian petroleum agencies concerned in order that a world picture might be made available'.

Thus, nearly two years after Pearl Harbour, the obstacle to effective long-term combined programming was finally cleared out of the way.<sup>1</sup> On 10th October 1943, a British working party arrived in Washington to collaborate with officials of the Petroleum Administration for War, the War Shipping Administration and the Army-Navy Petroleum Board in drawing up the first United Nations Oil and Tanker Programme. This programme reflected the strategic decisions taken at *Quadrant* the previous month and estimated the oil requirements of each Allied supply area quarter by quarter through 1944 and 1945, together with the tanker implications of meeting them. Its most important conclusion was that there would be a shortage of motor spirit beginning in the third quarter of 1944. There followed a demonstration that crystal gazing could create difficulties as well as advantages for Allied co-operation. For one of the consequences was the revival once more of the contentious question of United Kingdom home refining. The Americans, who had pressed so hard during 1942 for a stop to virtually all refining of imported oils in Britain,<sup>2</sup> pressed just as hard through the winter of 1943-44 for the plants at Fawley, Llandarcy and Grangemouth to be brought back into operation. 'For each fortnight that the renewed operation of the refineries is delayed a cargo of gasoline is lost as truly as if it had been sunk at sea', the United States Petroleum Attaché in London wrote impatiently in January 1944. The British, more conscious of the practical difficulties of starting up the refineries

<sup>1</sup> But the Petroleum Administration for War still only received information about Pacific requirements in block form and was thus debarred from participating in the calculation of tanker requirements. This meant that it could not easily cope with short-term variations in demand within the long-term programme. In February 1944 Mr. Davies called the Army-Navy Petroleum Board's attention to this. But it was not until May 1944 that the Army-Navy Petroleum Board agreed to release information on short-term requirements by theatre, and on tanker allocations, to the Petroleum Administration for War. See John W. Frey and H. Chandler Ide, *op. cit.*, Ch. VI.

<sup>2</sup> See pp. 313-314.

again in war conditions, took their time in making up their minds; but ultimately, in mid-February, they told the Americans that the plants would be brought back into service as quickly as possible. They never had time to put this into effect. In May 1944, the combined programming party, meeting in London, produced a second United Nations Programme for 1944-45, taking account this time of the strategic decisions of the *Sextant* Conference. The new survey indicated that there would be no petrol shortage after all and the decision to reopen the United Kingdom refineries was rescinded.

The revised programme brought up another problem, however, the prospect of a shortage of fuel oil to meet naval demands in the Pacific. This forecast led to a modification and stepping up of oil production programmes. For instance, the United States authorities decided to bring their 'naval reserve' field at Elk Hills, California, into production. The British for their part decided to reopen a small Shell refinery on Aruba which had been closed down at the end of 1942 to reduce a surplus of black oil that was at that time threatening to halt refinery operations in the Caribbean area.

(ii)

### Towards a Common Tanker Pool

The new United Nations Programmes benefited the planning and management of tanker tonnage as well as the planning and management of oil-producing resources. The joint programming enabled the allocation of tanker tonnage to be considered against a background of agreed oil requirements; it also made it possible, for the first time, to calculate how the supply of tankers would measure up to demands. The result was not too encouraging. Before the programming parties set to work the authorities had been confident about the long-term tanker position. In August 1943, the Combined Chiefs of Staff reported that there would be enough large ocean-going tankers to execute the *Quadrant* decisions and to meet all other needs; their only concern had been about the supply of tankers of under 5,000 deadweight tons needed for inshore work in support of military operations. But after the *Sextant* Conference they were less sanguine. 'It is believed', they declared, 'that sea-going tankers as necessary for agreed operations will be available', but it was certain that there would be no working surplus, and the tankers would have to be 'judiciously employed'. This was despite the fact that the combined working parties based their calculations of shipping requirements on the assumption that tankers would be distributed

more efficiently in the future—that is allocated to trades or tasks best suited to their characteristics of size and speed.

That there was still room for improvement in ship distribution may seem surprising. It will be recalled that the duty of securing 'such interchange and combined use (of ships) as will result in economy' had been one of the tasks placed on the Combined Shipping Adjustment Board in January 1942. Later, in March 1942, agreement had been reached between the War Shipping Administration and the British Merchant Shipping Mission<sup>1</sup> on the kind of tankers appropriate for the various routes. Nevertheless, a survey made in January 1943 showed that tankers capable of making eleven knots were being used in eight-knot convoys in the western hemisphere; and that eight-knot tankers that could have been employed in the western hemisphere were then working in SC convoys on cross-Atlantic routes. One of the achievements of the Lloyd Mission to Washington was an agreement to organise a series of 'swaps' between the two tanker fleets, and to set in hand a ship-by-ship survey of Allied tanker resources as a whole. This showed its first results in May 1943, when the Ministry of War Transport began to transfer British-controlled eight-knot tankers to South American trades. In November 1943 the War Shipping Administration exchanged some of their new 'non-Greyhound' tankers, required to ship military derv fuel to Britain, for equivalent British-controlled black oil tonnage needed in the Pacific.<sup>2</sup>

That these exchanges began so late was a sign of the ineffectiveness of the Combined Shipping Adjustment Board. By the spring of 1943 the failure of the Board to co-ordinate Allied tanker operations had become obvious; and the Americans began to consider the setting up of a new body to do the job. Discussions at the Ministry of War Transport with Mr. Brewster Jennings in April 1943 were followed by a definite American proposal to replace the Combined Shipping Adjustment Board, so far as tanker management was concerned, by a new Allied Tanker Co-ordinating Committee (A.T.C.C.). The committee was to be composed of the usual triumvirate—Captain Carter, Mr. Jennings and Mr. Wilkinson, together with a British Admiralty representative. The committee was to have two main functions: to ensure that tankers were allotted to the trades they were best suited for; and to co-ordinate the work of the four tanker operating agencies (United States Navy Department, War Shipping Administration, Ministry of War Transport and Admiralty) so that as Captain Carter put it, shortages in one area combined with surpluses in another should not occur as frequently happened

<sup>1</sup> See p. 256.

<sup>2</sup> This eliminated an expensive cleaning process to fit the British black oil tonnage to carry derv fuel.

through tankers being 're-assigned in trades by one agency without the knowledge of the others'. The new Allied Tanker Co-ordinating Committee was to be assisted by a working staff drawn from all the tanker operating agencies. The working staff was to: maintain 'complete information on all Allied tankers'; recommend 'to the agency concerned' such changes in the use of its tankers as might lead to greater efficiency; keep in continuous contact with these agencies, and concern itself with improving tanker turn-round times in ports. In addition to these purely ship-management functions, the Allied Tanker Co-ordinating Committee was also to recommend allocations of tonnage to execute the strategic decisions of the Combined Chiefs of Staff.

The British reacted to this proposal just as they were to react to the proposal for a Combined Petroleum Board. They welcomed the prospect of getting a more detailed and comprehensive view of tanker operations, but they wanted no new formal machinery. They feared that the setting up of the proposed Allied Tanker Co-ordinating Committee would lead to operational control over British-controlled tankers being vested in Washington, and they were no readier to concede this now than in the immediate aftermath of Pearl Harbour. The Americans, for their part, seem to have been innocent of any such intention. To allay London's fears they inserted two additional clauses in their draft memorandum setting out the functions of the proposed tanker committees. These clauses stated that the new body would not conflict with the 'administration or policy responsibility' of the Ministry of War Transport or any other Allied governmental agency, but would merely provide 'objective comprehension of the overall problem and co-ordination of effort'. In effect this brought the role of the new body closely in line with that originally allotted to the Combined Shipping Adjustment Board itself, which had been quite acceptable to London in 1942. Nevertheless, the British, fearful of military influence in Washington, were unmoved by this concession. The 'recommendations' of an Allied Tanker Co-ordinating Committee might, they thought, carry an authority it would be hard to resist. The British also noted that, unlike the civilian Combined Shipping Adjustment Board, the new tanker committee would have a strong Service element. They believed it would be heavily influenced by the thinking of the United States Navy Department; indeed it was intended to house the new committee in the same building as the Navy Department in Washington.

Faced with uncompromising British opposition, the Americans shelved their proposal for a permanent new body; instead they adopted the compromise device of an 'informal committee' (in fact, the triumvirate) which was 'to be furnished by all parties with all the information necessary for proper operation and forward planning of

the use of tankers'. This was very acceptable to the British. In effect, it preserved the *status quo*, but under a formula which could give a new impetus to fuller exchanges of information. A report from Mr. Wilkinson in the middle of July that the 'informal committee' had begun to receive information from the United States Navy about tankers suggests that the formula served its purpose. Meanwhile (possibly as a further insurance against control of tankers by the Services) there was an attempt to revive the tanker functions of the Combined Shipping Adjustment Board, and to link it with the 'informal committee'. As part of a general remodelling of the Combined Shipping Adjustment Board's organisation it was proposed to set up a new tanker section to which the 'informal committee' would report. However, nothing ever came of this.

Instead the proposal for an Allied Tanker Co-ordinating Committee was revived, and was more favourably received at the second time of presentation. During the later months of 1943 the British attitude towards it had changed. Distrust of American motives waned. 'At worst', wrote Mr. Wilkinson, the Allied Tanker Co-ordinating Committee project would 'simply prove a flop and cause a little unnecessary trouble . . . in . . . so doing'. Simultaneously the British became more conscious of the positive advantages of setting up new combined tanker machinery. This was a time of growing competition for tankers between the various war theatres, and London suspected that the United Kingdom supply programme was getting less than its due share of the tonnage available. The Ministry of War Transport urged, in January 1944, that before determining operational priorities 'the world-wide distribution of tankers should be reviewed to see how the shortage can best be borne . . . on a world-wide basis'. This clearly called for a more searching and systematic analysis of tanker utilisation than 'informal' machinery could provide. The proposed Allied Tanker Co-ordination Committee might be the answer. At least it could shed light on the United States Navy's use and employment of tankers.

After a visit to London late in 1943 Captain Carter was sufficiently encouraged to broach the question of the Allied Tanker Co-ordinating Committee again at the *Sextant* Conference in December. The British response was positive. 'We feel here', wrote a Ministry of War Transport official to Mr. Wilkinson, 'that the co-ordination of tanker employment is today necessary and that nothing but good can emerge from the working of the committees'. Nevertheless the British insisted on a number of changes in the American draft 'Memorandum of Organisation'. All reference to tonnage allocation was dropped; the Allied Tanker Co-ordinating Committee was to concern itself solely with tanker management problems and to leave questions of priorities to others. The British also insisted on giving the Allied



Tanker Co-ordinating Committee the two-headed pattern they had imposed on other combined Anglo-American bodies. There was to be a committee in London as well as Washington. The two were to have the same authority and there would have to be agreement between them before recommendations could go forward with the sanction of the Allied Tanker Co-ordinating Committee behind them. Finally—and this was a genuine contribution to efficiency—the British insisted that tankers on fleet attendance as well as tankers on freighting service should come within the compass of the committee. There was now a very large number of tankers attending the United States Navy in the Pacific, and to have left these out of account would have been to deprive the Allied Tanker Co-ordinating Committee of the means of assessing the validity of a significant proportion of Pacific demands.

On the basis of these changes, the Minister of War Transport, Lord Leathers, formally accepted the proposal for an Allied Tanker Co-ordinating Committee on 8th February 1944. The Washington Committee held its first meeting on 1st May; and the London Committee on 8th June 1944.

Subsequently the British took great precautions to prevent the new machinery from encroaching in any way on the control exercised by the Ministry of War Transport over the movements of British-controlled tankers. 'We are continually taking the line', wrote Mr. Wilkinson, 'that the London and Washington Committees are not designed to act as executive bodies, and the committee is merely a useful vehicle for discussion. Even though, therefore, it might happen to be at a committee meeting, nonetheless agreement on a point is reached as between the proper agencies (British and American) concerned and the committee itself cannot really agree to anything.' This restrictive interpretation of the powers of the Allied Tanker Co-ordinating Committee was later spelled out in more detail. A memorandum, to which both committees formally subscribed, declared baldly that there was no need to refer questions of tanker operation to the Allied Tanker Co-ordinating Committee although it would be normal practice to do so. The memorandum stressed that the Allied Tanker Co-ordinating Committees' powers were limited to the making of recommendations; and that these recommendations would only be put into effect if all tanker operating agencies—both British and American—agreed to accept them. Owing to this attitude of the British, the Allied Tanker Co-ordinating Committee never became an effective administrative body.

(iii)

### How Tankers were Distributed

The evolution of new machinery was not the only development affecting tankers after the middle of 1943. There was also a fundamental change in the supply position.

Previously—since the beginning of the war—sinkings of Allied tankers had been made good only in part by new building. In 1940 the British-controlled tanker fleet had been replenished by vessels released by the disappearance of the markets of continental Europe; and in 1941 by tankers diverted from supplying markets in the western hemisphere. Meanwhile the total supply of tanker tonnage available to the non-Axis world had steadily declined. This 'run-down' was checked at last in the autumn of 1942 when the rate of new launchings began to catch up with losses. Nine months later the earlier trend was dramatically reversed. During the final two years of the war Allied tanker strength—specifically that of the tanker fleet managed by Washington—grew uninterruptedly and with mounting rapidity.

This transformation came about because a steep fall in the rate of loss coincided with a high increase in the rate of launchings. The spring of 1943 saw what was to prove the last effective onslaught by the U-boats against the shipping routes of the North Atlantic. It was met by the Allies with improved defences and tactics, which forced the enemy to break off his effort in May.<sup>1</sup> The U-boats returned in September 1943 armed with new acoustic torpedoes, and working in packs. But their success was slight. In the twelve months onward from June 1943 the Germans sank only seventeen Allied tankers of some 210,000 deadweight tons in the Atlantic area; this compared with 130 tankers of nearly 1.6 million deadweight tons over the preceding twelve months, and 222 tankers of almost 2.7 million deadweight tons lost in the Atlantic during the calendar year 1942. In both January and May 1944 no Allied tankers were sunk by enemy action, either in the Atlantic, or anywhere else.

The contrast in the rate of tanker losses before and after the middle of 1943 is shown in Table 29. Its effect was enhanced by the ship-building feats of the Americans. They had reacted to their heavy losses in the Atlantic in the early months of 1942 by stepping up their construction programme, and by diverting shipyard capacity from dry-cargo tonnage to tankers. The results of this effort and of subsequent

<sup>1</sup> The introduction of very long range (VLR) aircraft to close the mid-Atlantic gap in air cover, and the reintroduction of support escort groups to carry the attack to the U-boats. S. W. Roskill, *op. cit.*, Vol. II, pp. 364 *et seq.*

United States programmes are also shown in Table 29. Between June 1942 and May 1943 the United States launched just over 1½ million deadweight tons of new tankers; between June 1943 and May 1944 the equivalent figure was over 4·1 million deadweight tons. Between Pearl Harbour and the Normandy landings in June 1944 the Americans launched upwards of 6 million deadweight tons of tankers; this was roughly about a third as much again in tonnage (and more than a third in carrying capacity) as the whole British-controlled tanker fleet at the outbreak of war. In addition United Kingdom

TABLE 29  
*Tanker Losses\* and New Building December 1941–May 1944*  
000 d.w. tons

	Losses†	New Building		
	Total	Total	'Greyhounds'	Other
December–February 1942	712	294	145	149
March–May 1942	1,147	258	126	132
June–August 1942	754	339	226	113
September–November 1942	447	391	249	142
December–February 1943	381	526	402	124
March–May 1943	294	720	659	61
June–August 1943	205	752	702	50
September–November 1943	110	1,397	825	572
December–February 1944	81	1,217	857	360
March–May 1944	90	1,156	1,095	61
Total December 1941– May 1944	4,221	7,050	5,286	1,764

\* Tankers of 1,600 gross tons and over, including tankers owned by the Admiralty and the Navy Department, whalers, etc.

† War losses and marine losses.

tanker launchings between Pearl Harbour and the Normandy landings amounted to 834,000 deadweight tons and Canadian shipyards launched 120,000 deadweight tons between mid-1943 and mid-1944. This made a combined Allied total of some 7 million deadweight tons in 2½ years.

Yet even this formidable figure fails to reflect the full rise in Allied oil shipping capacity. For the vast majority of new American tankers were of the 'T2' (Greyhound) type, launched for the first time in 1941; indeed after September 1942 no other type was laid down in United States shipyards.<sup>1</sup> These large vessels (they were all of them over 14,000 deadweight tons and most were of 16,700 deadweight tons or more) could travel at over 14½ knots, and load and discharge much more quickly than earlier types. The 'Greyhounds' were of

<sup>1</sup> See Appendix V, Note on Allied Tanker Building, p. 389.

particular value in the Pacific where the long voyages gave added time savings from their extra speed; in 1942 the majority of them were allotted for service there, mainly for fleet attendance duties. But even on the shorter cross-Atlantic routes, their capacity, when sailing unescorted, was reckoned at twice that of a 'ten-knot-convoy-tanker', mainly because they could sail by direct routes. The part they played in the Atlantic during 1942 has been mentioned in Chapter XIV.

The growth in size of the tanker fleet working for the Allied navies or in Allied trades (or in neutral trades which had to be maintained, in part at least, by Allied tonnage) can be seen from Table 30 overleaf. This shows an increase of about 40 per cent. between June 1943 and May 1944.

Table 30 also shows how the Allies distributed their growing resources of tonnage. It reveals that the biggest share, both proportionately and absolutely, went to the Pacific war theatre. Here the Allies went over to the offensive in late November with the seizure of atolls in the Gilbert Islands; and in February 1944 they initiated a fiercely-fought campaign in the Marshall Islands which ended in the last week of April. These large amphibious operations called for enormous quantities of bunker oil for naval vessels, transports and supply ships; and this oil had to be carried over lengthening distances as the battle moved deeper into the central Pacific. The number of tankers needed for this purpose was increased by the absence of shore facilities, which meant that many tankers had to wait a long time at the forward bases before they could discharge; at worst the tankers might even be held permanently as floating storage. By May 1944 five times as much tonnage was being employed on freighting service in the Pacific theatre as in the previous June. In the same period there was an increase of over 50 per cent. in the tanker tonnage allotted for fleet attendance. This was partly due to the development of equipment enabling convoy escorts to refuel at sea, which meant that all convoys were accompanied by escort oilers; but mainly the increased tanker tonnage in fleet attendance was due to the growing size of United States naval forces in the Pacific.

Outside the Pacific there was a rise of some 800,000 deadweight tons in tankers working in western hemisphere trades. This was a complete reversal of the trend of the previous eighteen months when tonnage in those trades had been reduced in order to release tankers for war service. There are two explanations for the increase. First, an increasing number of vessels were sailing up the United States eastern coast to change crews or to recondition in the north-eastern ports. Secondly, carrying a cargo from the Gulf to New York also made a convenient 'shakedown' voyage for 'Greyhounds' being launched from shipyards on the Atlantic and Gulf coasts.

TABLE 30  
Employment of Tanker Tonnage,\* analysis by Destination, 1943-44  
(1,600 gross tons and over)

	millions of d.w. tons								
	Total United Nations Fleet (1)	United Kingdom (2)	Western Mediterranean (3)	Pacific (4)	United States north eastern seaboard (5)	Other western hemisphere (6)	Indian Ocean (7)	Tankers on fleet attendance (8)	Tankers immobilised by damage, repairs, reconditioning or refitting (9)
End of May 1943	12.7	2.5	0.9	0.5	1.5	1.5	1.7	1.3	2.3
End of May 1944	16.9	3.3	1.4	2.0	2.0	2.0	1.8	2.2	1.7
† May-August 1943	12.9	2.8	0.9	0.6	1.5	1.5	1.7	1.4	1.9
† August-November 1943	13.8	2.5	1.2	1.0	1.7	1.5	1.8	1.6	1.7
† November-February 1944	15.2	2.3	1.5	1.5	1.8	1.7	1.9	1.6	1.8
† February-May 1944	16.4	3.1	1.5	1.7	1.9	2.0	1.7	2.3	1.7

\* Includes tankers in the control of other nations working to supply countries which British or American-controlled tankers would otherwise have had to supply.

† 4 month average.

(1) Includes depot ships, some non-ocean tankers and tankers about which information is incomplete, not included in subsequent columns.

(2) British Isles, Iceland and North Russia.

(3) Includes West Africa and Azores.

(4) Includes Vladivostok, supplied by a few American tankers transferred to Soviet flag.

(5) Atlantic coasts of United States and Canada. It covers all tonnage plying to and from the Gulf and Caribbean ports to the north eastern seaboard, but excludes movements from one part of the eastern seaboard to another. These are covered in the following column.

(6) Includes, from February 1944, some tankers engaged in intra-theatre movements in the Pacific and West Mediterranean which cannot be isolated from local movements in the western hemisphere.

(7) This includes the Middle East, taking in Libya, East Africa, South Africa, India and Ceylon, and 'British programme' tonnage supplying Australia and New Zealand. It includes tankers supplying the area from outside as well as from the Persian Gulf.

(8) Including tankers on fleet attendance immobilised for repairs.

(9) Excludes immobilised tankers on fleet attendance duties.

Increasing quantities of oil were also being carried, after mid-1943, to the north-eastern states—and to Canada as well—from the Caribbean area. Before Pearl Harbour this run had been a major traffic route. The eastern refineries of North America were operated to produce maximum white petroleum products, and the area relied on South American supplies to meet its full requirement of heavy oils. Crude oil deliveries from the Gulf ports also had to be supplemented mainly by Venezuelan crude oils. During the U-boat attacks of 1942 these movements from the Caribbean had dropped away almost to nothing. In 1943 they revived. The traffic was essential if refinery capacity to produce aviation spirit and petrol were to be fully exploited. This was true not only in the north-east but also in the Caribbean itself, where refinery operations had been gravely hampered at the end of 1942 by a surplus of black products.

But the main rivals to the Pacific war theatre in the demand for tanker tonnage were of course the two separate war theatres on the eastern side of the North Atlantic: the United Kingdom and the *Torch* area, now greatly enlarged by the victory in Tunisia in May 1943, the invasion of Sicily in July, and the invasion of Italy itself in September. This was a period when military oil demands were increasing rapidly in both theatres. In Britain the bomber offensive against the Continent and the build-up for invasion raised the rate of Service consumption by 60 per cent. In Italy the winter campaign which culminated in the advance towards Rome in May 1944 likewise forced up oil consumption; between July 1943 and June 1944 some 6½ million tons of oil products were shipped in bulk to the *Torch* area, now the 'West Mediterranean theatre'; and another 350,000 tons were shipped 'packed'. Yet, as Table 30 reveals, the tonnage employed in supplying the United Kingdom and the West Mediterranean together rose less than the tonnage supplying the Pacific; in terms of carrying capacity the advantage of the Pacific was even greater because a greater proportion of the tankers deployed there were 'Greyhounds'.

Two important developments helped to keep down the demand for tanker tonnage in the North Atlantic after the middle of 1943. One was the reopening of the northern sea route between the Atlantic and Indian oceans. On 17th May 1943, for the first time in three years, an Allied trade convoy left Gibraltar for the eastern Mediterranean; a fortnight later a westbound convoy set sail from Alexandria. The reopening of the Mediterranean diverted eastbound shipping away from the route round the Cape of Good Hope, and so reduced bunker offtake in South and East Africa, and with it the tonnage needed in Indian Ocean cross-trades; however, this was counteracted by rising demands in South-East Asia, so that the volume of tonnage employed in these trades did not change. The reopening also affected the need

for tankers in the Atlantic by reducing offtake at the West African bunker stations which were supplied direct from the Caribbean. But the main effect of reopening the Mediterranean was not on the pattern of demand at all, but on the pattern of supply to the West Mediterranean. It was now possible, and economical in tankers, to supply this theatre from Haifa and other Middle East refineries instead of from North America. These eastern supplies were 'programmed' by the British who indicated monthly the amounts they could spare to meet the requirements put forward by Algiers. The Americans, who held the principal responsibility for supply, then arranged to ship the balance needed by the theatre from western refineries.

The importance of this development, however, should not be overstressed. There were limits to the tanker saving made possible by supply from the Middle East. All aviation spirit used in the West Mediterranean theatre still had to be drawn from the western hemisphere, because the output of Abadan was all absorbed in the east. In any case the remoteness of the Persian Gulf refineries—Abadan was further by sea from Algiers than was New York—meant that shipments from them saved little tanker time; however after the middle of 1943 tankers moving out of the Indian Ocean for repairs or refitting invariably carried cargoes from Abadan or Bahrain for discharge in the West Mediterranean on their passage through to the Atlantic. The chief gain from the tanker point of view lay in the new feasibility of supply from Haifa. The oil authorities in London had grasped the significance of this and had begun to prepare for it months in advance. From a throughput of 2 million tons a year—the capacity, it will be recalled, of its feeder pipeline—Haifa's potential had been raised at the beginning of 1943 to 2½ million tons a year by plant modifications; the additional 750,000 tons of feedstock was pumped through the reopened northern branch of the trans-desert pipeline<sup>1</sup> to Tripoli, and then shipped down the coast to Haifa. 440,000 tons of fuel oil from the Kirkuk 'topping' plant set up in 1942<sup>2</sup> was also pumped through to Tripoli until June 1944, when the Kirkuk plant was dismantled. Meanwhile work went ahead to double the capacity of Haifa refinery in order to utilise the full 4 million tons capacity of the two branches of the trans-desert pipeline; this was completed in 1944.

The reopening of the Mediterranean was one factor helping to reduce the demand for tanker tonnage outside the Pacific theatre after the middle of 1943. A more important one was a further big improvement in the carrying capacity of tankers crossing

<sup>1</sup> This had been closed and its facilities partly dismantled in the autumn of 1941 as a precaution against a German advance. See Map facing p. 229.

<sup>2</sup> See p. 238.

the North Atlantic. The main factor here was the continued expansion in the operations of the New York Navy Pool. This expansion was made possible partly by increased shipments to New York by tankers making 'shakedown' and other 'technical' voyages, and by the growing crude oil imports from South America. But the main new inflow into the Pool was overland, and followed a vast increase in pipeline capacity between the Gulf coast states of America and its north-eastern seaboard. Of many pipeline projects carried through during this period, two may be singled out. Big Inch, a 24-inch diameter pipeline with a capacity of 15 million tons of crude oil a year had been asked for by the United States Office of Petroleum Co-ordinator as far back as May 1941, and had begun to be laid in August 1942, in yet another reaction to the high rate of sinkings. Between June 1943 and May 1944 Big Inch delivered about 9 million tons of crude oil from Texas to the north-eastern states; in addition it delivered supplies to Norris City (Illinois) which were carried on to the east coast by rail. The second major project was Little Big Inch, a 20-inch diameter line built to carry between ten and eleven million tons of mainly white oil products a year from east Texas to the New York area. Completed in March 1944 this pipeline had transferred 1¾ million tons of products to the north-east states by the end of May.<sup>1</sup> In all about 20 million tons more oil than in June 1942 to May 1943 was transported overland from the Gulf coast states in the twelve months from June 1943. Some of this was absorbed by the growing demand for bunkers, both naval and commercial, at the American north-eastern ports. The rest, together with the supplies shipped up from the south, was available for shipment across the Atlantic.

The main beneficiary of this huge movement of supplies into the New York Pool was United Kingdom imports. Between June 1943 and May 1944 some 13 million tons of oil, or about 80 per cent. of this country's total tanker-borne imports, was lifted from the American north-eastern ports compared with less than 40 per cent. in the previous twelve months.

(iv)

### 100-Octane Spirit: The Final Yield

Tanker space was not the only commodity where a big increase in supply was more than matched by increasing demand. Despite all efforts to expand production, the supply of 100-octane spirit after

<sup>1</sup> John W. Frey and H. Chandler Ide, *op. cit.*, Ch. VIII.

the middle of 1943 was also still less than was needed. Not until November 1944 did the monthly requests for supplies from the Aviation Petroleum Products Assignment Committee (A.P.P.A.C.) in Washington fail to exceed the amount available for allocation. Meanwhile shortage, and competition for supplies between war theatres, put a strain on relations between the Allies.

Disagreement revolved mainly round United Kingdom stockbuilding. In the summer of 1943 the claims of United Kingdom stocks had conflicted directly with the needs of air training programmes in the United States.<sup>1</sup> That clash had been resolved in a spirit of compromise which continued to show itself in the autumn. When, after the decision to launch a stepped-up air assault against the Continent, the United States Army Air Force in Britain presented a hugely increased forecast of consumption in September, Washington was ready to face the supply implications. A.P.P.A.C.'s allocation to this country was increased at the expense of the United States domestic allotment, and it was decreed that non-operational consumption in the United States must be cut down. For their part the British indented only for what they thought would be available; with the paradoxical result that the total demand put in to A.P.P.A.C. in September 1943 was lower than for many months. However, in October, the British members dissented once more against the United Kingdom allocation. Then, in November, the Air Ministry yielded to the realities of the production (and storage) position, and reduced the United Kingdom stock target. This made it possible to accept smaller allocations to this country. As compensation, however, the British pressed more earnestly than ever for their reduced target level to be treated as an 'essential minimum'; and for a 'mandatory and overriding priority over all other needs' to be given to reaching it by 1st May 1944, now the hypothetical date for the invasion of the Continent. The British argued that success would depend to a great extent on the maintenance of air operations. They pointed out that the Germans were likely to make an exceptional effort to interrupt seaborne supplies of oil at that time. They quoted the decision promulgated at the *Sextant* Conference to give absolute priority to the invasion of Europe and argued that this should be taken as applying to the provision of adequate stocks of 100-octane fuel in Britain. 'Never', cabled Mr. Wilkinson, 'has our case been more conservative or better substantiated.'

But once more the British failed in their effort to secure recognition of their country's claim for special consideration in stockbuilding. In December 1943, the Munitions Assignments Board approved a revised directive on theatre stock levels which recommended, over

<sup>1</sup> See p. 281.

the dissent of the British members, that the United Kingdom's reduced stock target should be reached by the 1st May 1944 only if 'urgently needed fuel [was] available in other areas'. The Combined Chiefs of Staff omitted this qualification when they issued the directive in January. But they refused to affirm positively that overriding priority should be given to reaching the United Kingdom target, although the British side asked for this. In the event, by June 1944, when landings in Europe began, 100-octane stocks in this country were no higher than four months earlier—and still some 200,000 tons below target.<sup>1</sup>

The inability of the British to build up their stocks to the level their own Chiefs of Staff thought necessary was part of the price they paid for dependence on American supplies. That dependence was very great. 100-octane spirit production at refineries under London's direction was never able to meet more than a small part of the requirements that London was responsible for supplying. Despite the efforts to expand production at sterling refineries both here, and in the Persian Gulf and the Caribbean, total sterling production in the closing months of the war was little more than one-tenth of the output at dollar refineries. Indeed, because of the particular difficulties of war-time, every one of the Government-backed 100-octane projects in the Persian Gulf and in the Caribbean area ran well behind schedule. The first of the three projected extensions to the Abadan refinery had been expected to begin operating by the end of 1942; for reasons already explained,<sup>2</sup> it did not do so until September 1943, and did not reach its full output until 1944. The second should have started production in the autumn of 1943, but did so a full year later; this was mainly because a crucially important cargo was sunk *en route* to Abadan in the middle of 1943. The third Abadan extension was not completed until 1945 was well advanced. As for the new American plant at Bahrain, this did not come into full production until the final month of the war.

Nevertheless, as Table 31 overleaf shows, despite the delays to plant extensions, Abadan's output of 100-octane spirit rose impressively in the middle years of the war when the Anglo-American Oil Company wrung the utmost from its existing plant, modified where possible. Technical improvements and changes in refining practice enabled the company almost to double Abadan's output of 100-octane spirit before the first extension came on stream.<sup>3</sup> The

<sup>1</sup> Assuming a target stock of four months' consumption, which at the rate on 1st May 1944 would have been over 1.5 million tons. Actual stocks at that date were under 1.3 million tons.

<sup>2</sup> See pp. 271–272.

<sup>3</sup> The raising of the permissible tetraethyl lead concentration from 4 to 4.8 c.cs. per Imperial gallon in the autumn of 1941 played a part in this. The further increase to 5.5 c.cs. in the autumn of 1943, helped to raise later production figures.

company then set to work to build a cumene plant from spare and salvaged materials. It took some time to finish this and to arrange for a supply of benzole to feed it. Production eventually began in June 1944 from Indian and South African benzole sent under governmental arrangements. But results were disappointing. The makeshift plant proved inefficient and the benzole itself was of low

TABLE 31  
*Production of 100-Octane Aviation Spirit 1942-45*

		000 tons			
		1942	1943	1944	July 1944- June 1945
Dollar Plants	United States Aruba (Lago)	3,075 n.a.	6,894 302	15,125 505	18,737 502
Sterling Plants	United Kingdom	184	345	549	513
	Curaçao	57	99	230	306†
	Trinidad*	88	130	165	195
	Abadan	258	390	858	995
Total dollar production		n.a.	7,196	15,630	19,239
Total sterling production		587	964	1,802	2,009

\* At Trinidad Leaseholds Ltd.'s refinery.  
† September 1944-June 1945.

quality. However, that same year Abadan began to receive 'alkylates' manufactured at Bahrain. In 1944 the Abadan refinery produced some 800,000 tons of 100-octane spirit; this was as much as the Hartley Committee<sup>1</sup> had planned to produce from three plants before the war. By 1945 the rate of output was over a million tons a year, which was more than thirteen times the output of the refinery at the time of Pearl Harbour.

In these later years of the war Abadan fared better than Curaçao, where there were also plans to increase 100-octane production by building new plant. Here the intention had been to finish all schemes by the end of 1943, by when the refinery should have been producing over 400,000 tons of 100-octane spirit a year. In fact, it was not until the spring of 1944 that Curaçao's new 'alkylation' and cumene plants came into operation.<sup>2</sup> Then, because of defective materials, the cumene plant worked well below its rated capacity of 50,000 tons a year, and even had to shut down in the later months of 1944; it did not reach its full output until the spring of 1945. As for the cracking and distillation plant transferred from the abandoned site

<sup>1</sup> See p. 56.  
<sup>2</sup> See p. 278.

at Thornton, this did not even begin to function until the very last month of the war in Europe.

The fact was that the time elapsing between the initiation and completion of 100-octane expansion projects was far greater at Curaçao than at Abadan, although it was easier to ship American equipment and materials to the Caribbean. This was because the Curaçao expansion projects, unlike those at Abadan, could not command an American priority rating high enough to compete successfully with America's own schemes during the eighteen months after Pearl Harbour. It was not until the summer of 1943, when it first began to look as if the shortage would continue well into 1944, that real American interest in increasing 100-octane spirit production at Curaçao was kindled. Indeed, in the case that involved the biggest delay, the Americans showed themselves indifferent, if not hostile, for most of the time. This scheme, to move plant from Thornton to Curaçao, was sponsored by the British as an iso-octane production project. It was actually a project to increase Curaçao's output of all white products, but to increase it by an amount which looked small by comparison with the resources the project would absorb. As a result, it did not receive an adequate American priority rating until the spring of 1944. By the time the plant came into service no less than three years had elapsed since the Oil Control Board's original decision to move it from Britain. That decision, like the earlier scheme for distributing 90-octane spirit, stemmed from a desire to minimise losses on the ill-fated Thornton project.<sup>1</sup> The wisdom of allotting labour and shipping resources to this undertaking during 1942 and 1943, before the willingness of the Americans to supply the necessary supplementary materials had been clearly established, seems highly questionable.

So much for the sterling plants overseas. In the United Kingdom the expansion programme was less ambitious since it did not provide for any new construction. However it was of the greatest value after the middle of 1943 because the United Kingdom plants were then situated within the main theatre of air operations.

In these later years of the war the level of 100-octane production in Britain ceased to be determined by the supply of high octane blending agent; and imports of these, from the United States, never more than small, ceased altogether. One reason for the change was the raising of the permitted concentration of tetraethyl lead from 4.8 to 5.5 c.cs per Imperial gallon in the autumn of 1943. This was followed by an important technical advance at the Billingham plant: the development of victane, a blending agent with the same properties as cumene, but produced by alkylating benzene with butylene instead of propylene, which was not available in Britain. Victane

<sup>1</sup> See pp. 275-276.

production began in March 1944 at a rate of about 20,000 tons a year. The benzole needed to make it was diverted from Heysham where the mixing of benzole with the gas oil feedstock ceased in May 1944.

Now that the supply of blending agent had ceased to be the limiting factor on production, the output of 100-octane spirit could be raised at both Heysham and Billingham simply by increasing throughput. Between the autumn of 1943 and the autumn of 1944, this was raised several times at both plants, since both had surplus hydrogenating capacity hitherto devoted to the production of ammonia. Billingham was also fed with better quality creosote feedstock so that a higher yield of 'base' spirit per ton was obtained. The same effect was achieved at Heysham by lowering the standard of 'volatility' required from Heysham 'base' spirit. The upshot was that Billingham's output of 'base' spirit was nearly doubled; and in mid-1944 Heysham reached an output 20 per cent. greater than its pre-war rated capacity. However, this performance, achieved in response to a threat of shortage in the early weeks of the Normandy landings, was at the expense of stopping all ammonia production at Heysham, and was only maintained for a brief period.

The United Kingdom plants not only raised their output of 100-octane spirit during 1944; they also supplied part of that output to a more stringent specification—in the form of a fuel with a rich mixture performance number of 150.<sup>1</sup> This feat was made possible by raising once more the permissible concentration of tetraethyl lead—this time to 7.2 c.cs per Imperial gallon. Success in solving the considerable technical problems this change created was announced at the end of 1943. Another important contribution came from the introduction into the United Kingdom blending programme of a new additive, mono-methyl-aniline, developed in Britain. Mono-methyl-aniline was one of the aromatic amines increasingly used as a 'rich mixture' constituent in the final years of the war, despite some undesirable characteristics, to eke out supplies of blending agent. In 1943 the Americans had begun using xylidine to manufacture a slightly lower quality 100-octane fuel, rated at 98/130 and 99/130, for use by crew-training aircraft. Mono-methyl-aniline was better than xylidine since a slightly higher percentage of it could be added to the fuel.

In January 1944 the demand for 150 grade fuel was estimated by the Air Staff at 350,000 tons a year. Production began in February 1944. It was halted at the end of March when it looked as if the problems caused by the high concentration of tetraethyl lead might not be solved after all. Another setback came when the production

of mono-methyl-aniline fell short of estimated requirements. As a long-term solution it was decided to make this deficit good by importing American xylidine. Production of 150 grade fuel began again in June 1944, when it began to be used in operational aircraft.

150 grade aviation spirit gave an advantage in speed and rate of climb to aircraft covering the assault on occupied Europe. Subsequently it was used by aircraft intercepting the V.1 flying bombs. However, demand for it never built up as expected. Over the second half of 1944 the consumption of 150 grade accounted for less than 5 per cent. of total United Kingdom consumption of 100-octane spirit. Imports of xylidine proved unnecessary, the output of mono-methyl-aniline being more than sufficient for the reduced 150 grade programme; indeed there was some left over to increase the manufacture of 130 grade. Production ceased for good at the beginning of April 1945.

The problem of expanding 100-octane production in Britain had an administrative as well as a technical side. The three plants concerned, namely Billingham, Heysham and Stanlow, were all different in character and under separate ownership. For them to function as an integrated production unit it was necessary that they should come under the control of a co-ordinating committee; and it was natural that production planning should centre round the activities of the largest producer, Heysham. The Trimpell Management Committee, which operated Heysham, was a forum in which the owners of all the plants came regularly into contact. Thus it happened that this Trimpell Management Committee gradually came to fill the vacant place by supervising the activities of all three plants. As Heysham was a Government-owned plant the Trimpell Management Committee was always subject to the control of the Ministry of Aircraft Production; so that again, by a natural extension, control of United Kingdom production as a whole gradually fell under that Ministry's authority.

This was the way production planning was handled down to the end of 1943. The disadvantage was that there was no clear distinction between production policy and programming (i.e. what and how much to produce) and blending policy (i.e. how to fulfil production policy from the materials available). When, in the second half of 1943, two new, and to some extent mutually conflicting aims—the need to produce 150 grade spirit and to export as much benzole as possible to the United States—were added to the need to achieve maximum output, the system broke down. In an attempt to satisfy all these demands a series of programmes embodying various combinations of production and blending policies were produced. Amid their changing complexities all sense of direction and purpose disappeared.

<sup>1</sup> See p. 268.

What was needed was a new co-ordinating body with a clearly defined responsibility for production planning and a recognised authority which would leave no room for misunderstanding. This was provided in January 1944 with the setting up of a new Aviation Co-ordination Committee. Chaired by an official of the Ministry of Aircraft Production, it comprised representatives of Trimpell Ltd. and of its constituent companies, representatives of Shell-Mex House, (which was responsible for moving components between the three plants) and of the Petroleum Department (which was responsible for imports of components). The new committee met once a month and took all the decisions on production policy. Blending policy remained in the hands of the Trimpell Management Committee, working through an executive sub-committee. A sub-committee of the refinery managers took day-to-day working decisions within the framework of that policy.

The overcoming of the technical and administrative obstacles to 100-octane spirit manufacture in this country was a useful forward step. But its significance should not be overrated. This was only one problem among many facing the oil authorities in Britain. It is time to return to the others.

## APPENDIX V

### Note on Allied Tanker Building

#### *British Tanker Building*

The standard British tankers built during the war were of the well-tried 'three twelves' type (12,000 deadweight tons, 12 knots and 12 tons per day fuel consumption). Their length was 460 feet and they had a draught of 27 feet 6 inches. Eighty of these were built.

In addition between 1939 and 1943 the British built twenty-one 'Norwegian type' tankers. These were of 14,500 deadweight tons and 12 knots speed. In the later years of the war these 'Norwegian type' tankers were replaced by 'Greyhounds'.

The keels of the first British 'Greyhounds' were laid in the autumn of 1942. They were highly uneconomic vessels from a commercial point of view with a speed of 15 knots but a deadweight tonnage of only 12,000. The decision to build 'Greyhounds' was taken reluctantly, under American urging. The decision to build only small 'Greyhounds' was opposed by both the Americans and the oil companies. The British authorities first contended that the larger engines these would need could not be provided without drawing on resources allocated to dry-cargo tonnage; later they argued that the larger berths they would occupy in shipyards were needed for dry-cargo tonnage. It was also said that 15,000 deadweight ton tankers would take too long to build. Down to the end of July 1945, thirteen British-built 'Greyhounds' came into service, the first being launched in February 1944. Six of them were made over to the Admiralty and used for fleet attendance duties. In addition one large vessel of 17,000 deadweight tons and capable of making 16 knots was constructed by Shell. This tanker, the *Olna*, was laid down in July 1943 and completed in March 1945.

#### *American Tanker Building*

Most American tankers built during the war were 'Greyhounds' (tankers capable of making 14½ knots or more). The first 'Greyhound' was launched in 1938. In 1941 the Americans launched fifteen, of 197,000 deadweight tons, constituting nearly half of their output for the year. In 1942, of those tankers launched, only five (of 88,000 deadweight tons) were not 'Greyhounds'.

However in the autumn of 1942 the Americans decided to raise their tanker output by diverting shipyards building 'Liberty' ships



into building 'Liberty' tankers instead. At one time it was planned to build 102 of these, but the programme was cut down in the autumn of 1943. 670,000 deadweight tons of 'Liberty' tankers were launched between September 1943 and February 1944. They were of 10,000 deadweight tons capacity and capable of making 11 knots.

The American 'Greyhounds' built during the war were mostly of the 'T2' type. These were about 500 feet long, drew just under 30 feet of water, were of about 16,500 deadweight tons and were capable of making  $14\frac{1}{2}$  or  $16\frac{1}{2}$  knots according to specification. There was also a 'T3' version, which was steam-driven and capable of  $15\frac{1}{2}$  knots.

For the use of their Navy the Americans built a larger and faster 'Greyhound' (also classified 'T3'). This was 525 feet long, of about 18,400 deadweight tons, and was capable of 18 knots.

## CHAPTER XVIII

### THE SHADOW OF OVERLORD

(i)

#### The Growth of Demand

THE invasion of the Continent, which came to have the code name *Overlord*, dominated the oil scene in Britain for more than twelve months before the Normandy landings. Preparations for the invasion had a very marked effect on the size of oil demand. Since the outbreak of war oil consumption in Britain had been larger, but not significantly larger, than in time of peace. The trend, gently rising until the middle of 1942, had left demands still no more than about one-sixth greater than in 1938. During the twelve months after outbreak of the war consumption actually fell in response to economy measures introduced that year. In the middle of 1943, however, there was a dramatic change both in direction and pace. Total consumption of oil climbed by 66,000 tons a week—a jump of roughly 25 per cent. This was greater than the total increase in consumption that had taken place throughout the whole preceding five years since 1938. The table on p. 392 gives details.

The biggest increase was in the demand for aviation spirit. At first this lagged well behind expectations. Between June 1940 and May 1941 demand for this product remained lower than the pre-war plans had forecast for the first year of war. The bombing strategy adopted in 1940-41 led to an increase in consumption; but even then demand in 1942 stayed well below the forecast presented to the Americans in the summer of 1941. A lag in British aircraft output, the non-delivery of American aircraft expected before the United States entered the war, the diversion of aircraft to overseas theatres and the transfer of a large number of aircraft to the Russians all contributed toward keeping the consumption of 100-octane spirit in Britain under 700,000 tons during 1942, as compared with more than 1·3 million tons forecast the previous year. Thus it was not until 1943 that Royal Air Force consumption in Britain rose in line with estimates; in that year there were also increasing demands from the United States Army Air Force in this country. However, as the table demonstrates,

it was in the period 1943-44, following the decision of the *Trident* Conference of May 1943 to step up the air offensive against Germany, that the greatest increase occurred. Demand reached a peak in the early months of 1944 as a result of good flying weather and lower casualties than expected. Most of this extra demand was by the United States Army Air Force which was accounting for nearly half of the total of aviation spirit being consumed in Britain by the end of May 1944.

TABLE 32  
Consumption of Petroleum in the United Kingdom 1940-44 (weekly average)

000 tons

	Total consumption	Armed Forces consumption			Civil consumption		
		Admiralty oil fuel	Aviation spirit†	Motor fuel‡	Bunkers§	Motor fuel‡	Other
June 1940-May 1941	230.5	48.5	9.8	11.2	21.9	67.4	71.7
June 1941-May 1942	241.7	48.1	16.4	12.8	17.9	64.2	82.3
June 1942-May 1943	239.2	46.1	28.1	13.4	26.1	53.7	71.8
June 1943-May 1944	306.6	60.4	60.3	23.7	29.8	50.8	81.6

\* Including refinery fuel and bitumen, and therefore not comparable with Table 3.

† Including small quantities used by engine manufacturers. This amounted to rather more than 10 per cent. in 1941 and 1942; thereafter the proportion declined.

‡ Petrol and derv fuel.

§ Ocean-going vessels only, and therefore not comparable with the figures in Table 3.

|| Including consumption of other products by Armed Forces.

The growth of American military forces in Britain was also reflected in the big rise in motor fuel consumption by the Services during 1943-44; this followed three years of very gentle growth when British military strength was being built up in overseas theatres much more than within Britain. By contrast the consumption of Admiralty oil fuel was actually on a declining trend down to the middle of 1943, with consumption far below the 59,000 tons a week of the first nine months of the war. A brief spurt of demand in the spring of 1941, associated with action against German surface raiders in the North Atlantic, was not repeated in 1942 when the focus of enemy activity had shifted to American waters. After the middle of 1941 the Admiralty's supply commitment had been increased by the need to lay down oil stocks in Iceland, which was occupied in May of that

year and developed as a naval base for the protection of the North Atlantic convoys, and later as a terminus of the convoys to North Russia. These convoys also made necessary the laying down of oil supplies in north Russian ports for the escorting warships. In September 1942 the Americans took over the Iceland commitment, but at the end of 1943 the Admiralty again shouldered this responsibility.<sup>1</sup> These operations swelled a demand which was already reflecting the growth in convoyed shipping traffic in these final months before D-day. Between June 1943 and May 1944 average weekly offtake of Admiralty oil fuel rose again above the level reached in the first nine months of the war. Between the middle of 1940 and the middle of 1944 consumption of the three main items of Service demand—aviation spirit, motor fuel, and Admiralty oil fuel—rose by 75,000 tons a week.

An offsetting factor in the first three years was the fall, of over 10,000 tons a week, in civilian consumption. But after the middle of 1943 this also began to rise again. The level of civilian demand was much affected by the rise and fall in commercial bunker offtake. It will be recalled that in the spring of 1941 shipowners had been instructed to bunker oil-burning vessels overseas even if this meant shutting out cargo. This policy had been relaxed in the later months of that year, and was reversed altogether in respect of many merchant ships in July 1942. The Ministry of War Transport then ordered that ships bound for the East should take on as much fuel as they could before leaving this country. The reason for this *volte-face* was the congestion at Freetown and other West African bunker stations arising from the greatly increased flow of shipping round the Cape of Good Hope that followed the outbreak of war with Japan. Together with *Torch*, which was partly launched from the United Kingdom, the new bunkering policy increased offtake from this country's ports by an average of more than 8,000 tons a week during 1942-43. Early in 1943 the recovery of the great bunker station at Dakar ended the pressure on Freetown and east-bound ships reverted to their normal bunkering patterns. But the rising trend of offtake continued after the middle of 1943 as imports and shipping traffic to Britain built up in the pre-invasion months. Indeed bunkering at United Kingdom ports was deliberately increased at the turn of the year when stocks of fuel oil had risen embarrassingly high. Thus 'Greyhound' tankers, instead of bunkering for a full round trip in the western hemisphere, began taking on fuel in Britain for their return journey. This policy increased their cargo-carrying capacity when sailing towards this country.

<sup>1</sup> United States warships ceased to use the Iceland base in January 1944, and the change released four 'Greyhounds' which had been wasting their speed supplying Iceland from North America and travelling part of the way in HX convoys.

Excluding bunkers, civilian consumption of oil products other than motor fuel also rose in the twelve months preceding *Overlord*, although this consumption did not regain the level of 1941-42. The most noteworthy increases were in consumption of paraffin and of gas oil for gas manufacture.

The growth in demand for engine paraffin (vaporising oil) brought about by agricultural expansion, and the efforts of the authorities to prevent paraffin wastage, have already been described.<sup>1</sup>

TABLE 33

*Paraffin and Gas Oil Consumption in United Kingdom 1940-44 (weekly average)*  
000 tons

	Gas oil mainly for gas making and grease blending	Engine paraffin	Household* paraffin
June 1940-May 1941	4.2	6.2	11.5
June 1941-May 1942	4.9	8.6	10.1
June 1942-May 1943	3.9	11.2	9.6
June 1943-May 1944	7.3	12.3	9.1

\* Including consumption by the Services.

In 1942-43 consumption reached about 580,000 tons and in the following twelve months it rose to over 620,000 tons. These figures may be compared with the 540,000 tons to which, in the middle of 1942, the authorities had hoped to cut consumption during the calendar year 1943. Meanwhile the consumption of household paraffin varied very little between 1942 and 1944 after the cuts imposed on deliveries in 1941 and 1942. By contrast the use of gas oil used by gas undertakings moved up and down as the authorities tried to reconcile their desire to reduce oil imports with their need to replace coal by oil as the raw material for gas making. After a relatively high level of demand in the winter of 1941-42 consumption dropped away to well below what had been expected in 1942-43. This was mainly because of the mildness of the winter that year; but the economy campaign launched under the auspices of the Gas Industry Oil Committee also played its part. In September 1943, however, following a shortfall in coal deliveries to gasworks during the summer, the gas industry was encouraged to use gas oil to the maximum possible extent to save coal. Undertakings were instructed to provide

<sup>1</sup> See pp. 309-311.

at least 10 per cent. of their output in the form of carburetted water gas. In that winter and in the winter of 1944-45 they were accorded a Government subsidy to meet the additional costs incurred by exceeding their normal winter gas oil consumption.<sup>1</sup> This sharp change in official policy was necessary not only because coal was short, but also because military conscription had deprived the industry of the strong young men needed to handle coal. The policy change led to an increase of almost 90 per cent. in the consumption of gas oil for gas manufacture between June 1943 and May 1944.

There was one particular item which stood out against the broad picture of higher consumption in the twelve months preceding *Overlord*: civilian consumption of motor fuel, which had declined steadily since 1940, fell even further during this period to barely more than half its pre-war level. Details are shown in Table 34 on page 396.

The table illustrates the size of the contribution to saving imports that was made by the private motorist. From a level of 16,000 tons a week in 1940-41 consumption of petrol by private cars and motor cycles dropped to a mere 5,900 tons a week during 1943-44. The largest fall, of some 6,000 tons, came, not surprisingly, after July 1942 when the basic ration was abolished and supplementary allowances cut. As was expected, a short-term side effect of the abolition of the 'basic' proved to be an increase in essential consumption, as motorists who had been using their 'basic' or semi-essential allowances for essential purposes successfully applied for new allowances to replace those they had lost. It was not until 1943-44 that the new discretionary petrol issues could be brought under firmer restraint. Another notable effect of the abolition of the 'basic' was the disappearance of many more cars and motor cycles from the roads. It was this factor that was primarily responsible for the further fall in 'other' consumption that took place in the period preceding *Overlord*. Between June 1943 and May 1944 the number of cars and motor cycles licensed for the road averaged 723,000 and 118,000 respectively: for the previous twelve months the figures were 776,000 and 199,000. (In 1941-42 there had been 1,352,000 cars and 280,000 motor cycles licensed.)

Figures for motor fuel consumption by commercial transport reflect the steady decline in passenger-carrying amenities after 1941. During 1943-44 there was a further curtailment of urban bus services and all long-distance coach services were stopped except in cases

<sup>1</sup> The cost per therm of carburetted water gas was calculated at 6/3d to 6/7d per therm in comparison with from 1/8d to 2/7d per therm for coal gas. This took into account the gas company's loss of revenue from the sale of tar, benzole, ammonia, breeze and coke etc. The subsidy was paid on 'normal winter consumption' and was taken as the average of the amounts used over the five 'hard' winter months of 1941-42 and the five milder winter months of 1942-43.

TABLE 34  
Civilian Motor Fuel Consumption in the United Kingdom 1940-44 (weekly average)

	000 tons											
	Grand Total*			Private			Commercial			Industrial Users†	Agricultural Users†	Public Authorities and Police†
	Total†	Essential	Other	Total†	Goods Vehicles	Passenger Vehicles	Total†	Goods Vehicles	Passenger Vehicles			
1938	100.8	—	—	47.6	—	—	49.0	33.8	15.2	—	—	—
June 1940-May 1941	67.4	5.0	11.1	16.1	5.0	11.1	36.1	26.6	9.5	—	—	—
June 1941-May 1942	64.2	5.1	8.4	13.5	5.1	8.4	37.2	26.6	10.6	—	—	—
June 1942-May 1943	53.7	5.5	1.7	7.2	5.5	1.7	34.5	24.6	9.9	—	—	—
June 1943-May 1944	50.8	5.1	0.8	5.9	5.1	0.8	32.1	22.7	9.4	—	—	—

\* Petrol and derv fuel consumption in Great Britain and Northern Ireland. Includes consumption by taxicabs and other users not accounted for in subsequent columns.

† Consumption in Great Britain only. Distribution between users is based on net coupon issues (i.e. total issues, less coupons, if any, returned unused). The distribution therefore reflects only the purposes for which the coupons were issued and not any illicit use to which they were put. Any consumption against forged or stolen coupons would not be covered.

where it could be shown that real hardship would be caused to isolated communities. As for goods vehicles the steady decline in their fuel consumption seems to have been due for the most part to schemes for rationalising road transport movements, notably in the distribution of foodstuffs, that were introduced in the course of 1942.<sup>1</sup> There was no deliberate attempt in these years to reduce road transport's contribution to the total supply of transport services in order to save motor fuel. It remained Government policy to utilise road haulage as required to relieve the railways and assist the coastal fleet.<sup>2</sup>

A disappointment of this period was the outcome of the scheme, launched in the spring of 1942, to convert some 3,000 buses and 7,000 lorries to gas traction to save about 100,000 tons of imports a year. Operators proved reluctant to convert their vehicles since they had to bear the cost themselves, and the manufacture of the Government Emergency Type Gas Producer units enjoyed a relatively low priority. By the middle of 1944 only 1,100 buses and 400 lorries had been fitted with producer units.<sup>3</sup> Of possibly greater importance as an import-saver was improvement in the effectiveness of the machinery for enforcing Motor Fuel Orders now that all basic rations had been abolished. Most illegal consumption took place through the misuse of commercial coupons or supplies, figures of which were correspondingly inflated. From April 1943 the District Transport Officers, all of them Government appointees, began to pay unscheduled visits to the sub-district offices of the Emergency Road Transport Organisation at least once every three months. *Inter alia*, the District Transport Officers reported on the quantity of fuel coupons held in the transport organisation's office and on the adequacy of the organisation's check on vehicle records. In September 1943 the Petroleum Department's Enforcement Branch took over the task of investigating offences by commercial transport operators as well as private motorists. By that time the Enforcement Branch was considerably stronger than it had been in 1941. By the end of 1942 it had a complement of 75 inspectors and in April 1943 a Regional Enforcement Officer was appointed to each petroleum region, working under a Chief Enforcement Officer at headquarters. There are no complete records of the cases looked into by the Enforcement Branch. An estimate from such figures as are available suggests that between fifty and sixty thousand were investigated between June 1943 and May 1945; this was in addition to investigations by the police acting independently to enforce the Motor Fuel Orders.

<sup>1</sup> C. I. Savage, *op. cit.*, Ch. XII, Section (ii).

<sup>2</sup> C. I. Savage, *op. cit.*, Ch. XVII, p. 620.

<sup>3</sup> For a fuller account see C. I. Savage, *op. cit.*, Ch. XI.

(ii)

## Supply

Despite the further decline in motor fuel deliveries for civil use, the level of oil consumption in the United Kingdom was 25 per cent. greater in the twelve months before *Overlord* than in the previous twelve months. To meet these additional requirements the authorities had no unused productive reserves to draw upon within Britain. Total supplies of oil from indigenous materials were no greater in 1943-44 than in the previous twelve months. The output of petrol at Billingham increased but benzole production had reached its peak in 1942-43; in any case much of Britain's benzole was exported. The hopes of a big expansion in the output of the Eakring oilfield were disappointed, since production fell away after the middle of 1943. Shale oil production also declined because of a loss of workers to the coal industry; the throughput of the shale oil refinery at Pumpherton fell slightly but persistently after 1942.

There was also some decline in the use of coal tar fuel oil in place of imported fuel oil. The main obstacle here was not, as in the earlier years of the war, on the conversion side. To its credit the Petroleum Board pressed hard with the not very congenial task of urging its customers to burn a competitive product; and the oil industry burned coal tar fuel itself in its own plants. However, the oil industry's receipts of creosote-pitch mixture did not keep pace with the capacity of the plants converted to its use—a circumstance which, as might have been expected, generated some friction between the Board and the Coal Tar Controller. The fact was that the Coal Tar Controller was frequently not in a position to give a reliable forecast of supplies. The amount of crude tar available for processing at the tar distilleries depended on factors which the Controller could not control—namely, the level of demand for gas and metallurgical coke. To add to the problem there was always some uncertainty about the activities of the distilleries; now and again some would find themselves impeded by a shortage of pitch, while others were hampered by a pitch surplus. During 1943 some 22,000 tons of pitch was transported between distilleries at the expense of the Petroleum Board. In any case, creosote-pitch was only a residual product of the tar distilleries, taking second place to the needs of Billingham for creosote feedstock, and the varying requirement for refined tar for airfield construction. In the event total receipts of fuel oil from home sources in the twelve months before *Overlord* was 300 tons a week less than in the previous twelve months.

In all, domestic resources contributed less than 7 per cent. to total United Kingdom oil supplies between June 1943 and May 1944. The bulk of demand was met by imports. These are shown in the following table.

TABLE 35  
*United Kingdom Oil Imports 1943-44\* (weekly average)*

	Total Imports†	Surplus Bunkers	Eastern Seaboard	Gulf/ Caribbean
June 1942–May 1943	215·8	5·1	66·3	144·0
June–August 1943	364·0	18·3	287·3	56·9
September–November 1943	306·6	18·3	212·9	73·6
December–February 1944	249·9	16·4	189·0	42·7
March–May 1944	402·4	24·4	291·9	84·5

\* Based on calendar months. These figures are not strictly comparable with figures of consumption in Table 32.

† Including small imports from miscellaneous sources, and packed imports, not covered in the following columns.

The table shows an increase of more than 60 per cent. on the previous year's figure in the weekly rate of total oil imports into Britain during 1943-44. A major factor in this increase was the bigger contribution from the 'Greyhound' convoys which delivered more than 6·1 million tons of oil to Britain in the twelve months preceding *Overlord*. A point to notice is the unequal way in which 'Greyhound' deliveries were distributed within the twelve-month period; five-sixths arrived in this country between November 1943 and May 1944. The fact was that the shortage of suitable escort warships, which had hindered the development of the fourteen-knot (CU) all-tanker convoys from the Caribbean in the early months of 1943, continued throughout the summer and autumn of that year—partly because priority was given to the escort needs of the fast troop convoys that began ferrying American forces to Britain in September. In consequence the CU convoys sailed from Curaçao only every six weeks, with the 'Greyhound' tankers using the intervals between convoy sailings to make shuttle trips to the New York Navy Pool.

The British did not passively accept this state of affairs. They persistently pressed the Americans to allocate more fast tankers to the supply of the United Kingdom. To get round the obstacle of the escort shortage for 'Greyhounds', the British urged that the number of tankers per CU convoy should be increased, and that 'Greyhounds' should sail independently across the Atlantic from

the Caribbean. The Americans still stoutly refused to allow independent sailings but they did agree, at the end of June 1943, to raise from sixteen to twenty-four the number of 'Greyhounds' that could sail in each CU convoy. The Americans did so despite their doubts about whether twenty-four tanker convoys could be turned-round quickly enough at British west coast ports—although they adamantly refused to consider relieving the pressure by diverting any of the 'Greyhounds' for discharge along the east coast of Britain. CU.3 sailed on 10th July with twenty-three 'Greyhounds' and CU.4 left the Caribbean in the last week of August with twenty-one. Meanwhile, in response to intense British pressure in Washington in which the Minister of War Transport, Lord Leathers, took part, the Americans had been assembling and loading 'Greyhounds' at New York in order to add a second squadron to the CU system. This was also held up by lack of escorts and did not sail for Britain until 13th October. Thus it was not until November 1943, when a third squadron was added to the CU system, that the fourteen-knot tanker convoys to Britain began to play the role for which the Lloyd Mission to Washington had cast them ten months earlier.

From 20th November 1943 the CU convoys sailed every twelve days for Britain, and the average number of tankers per squadron grew steadily. Between mid-December 1943 and mid-January 1944 the average was fourteen; between mid-January and mid-February it was sixteen. On 22nd February 1944 a fourth squadron was added to the system and the interval between sailings cut down from twelve to nine days. Even so, the size of the CU convoys continued to rise; on the eve of D-day they averaged over nineteen 'Greyhounds', which was as much as the British west coast ports could handle. The carrying capacity of the CU 'Greyhounds' benefited considerably during these later months from the rise in overland oil movements into the New York Navy Pool, where there were now sufficient supplies available for loading to meet nearly all United Kingdom import needs. Between December 1943 and May 1944 the tankers in the CU convoys lifted nearly 75 per cent. of the cargoes they brought to Britain from the Pool instead of from the Caribbean, thereby increasing carrying capacity by one-fourth. This change in loading policy was made possible by the transfer, in November 1943, of the CU convoy starting point from Curaçao to New York<sup>1</sup>—which had become less congested since June 1943, when the starting point of the medium-speed general convoys to *Torch* (UGS) had been moved away to Hampton Roads.

<sup>1</sup> 'Greyhounds' still loading in the Gulf or Caribbean broke away on the approaches to New York and sailed down the coast and back again independently. They then, as advantage directed, either discharged into the Pool in New York or carried on across the Atlantic in the next convoy.

The spectacular increase in 'Greyhound' deliveries to the United Kingdom in the final six months before *Overlord* should not be allowed to overshadow the fact that, out of 17 million tons of oil carried to this country between June 1943 and May 1944, 11 million tons was carried in other kinds of ships. Contributing to this was a fourfold increase in surplus bunker deliveries; these exceeded one million tons in the twelve-month period, not far short of the total contribution from Britain's indigenous sources. In part this rise reflected the growth in the number of vessels sailing to this country in preparation for *Overlord*; but included in the total are oil shipments to Britain made between February and April 1944 in the deep forward tanks of 'Liberty' ships. As for the remaining 10.1 million tons of imports, these were still being carried in tankers sailing in ten-knot (HX) and eight-knot (SC) trade convoys. The volume of these 'non-Greyhound' shipments in 1943-44 was much larger relative to the tonnage employed than was the case in 1942-43, because of a spectacular improvement in the carrying capacity of HX and SC tankers. This is illustrated in Table 36 below.

TABLE 36  
*Round-Voyage Times of Tankers supplying the United Kingdom 1942-44*

Period	Average round-voyage time from all sources		Average round-voyage time from New York Pool		Average round-voyage time from Gulf/Caribbean ports	
	HX/SC* tankers	'Greyhounds'	HX/SC* tankers	'Greyhounds'	HX/SC* tankers	'Greyhounds'
June 1942-May 1943	71 days	—	54 days	—	80 days	—
June 1943-May 1944	48 days	37 days	48 days	36 days	—	44½ days

\* These times do not take account of the performance of tankers working for the Admiralty, or tankers discharging at ports on the east and south coasts of Britain.

The table brings out the extent to which tanker performance improved as a result of the change in the pattern of supply brought about by growing use of the New York Navy Pool. After the middle of 1943 the only ten-knot and eight-knot tankers loading in the south for Britain were tankers carrying supplies for the Admiralty. Another factor improving tanker efficiency in the later period was the less severe North Atlantic winter of 1943-44. However, tanker efficiency suffered in the months before *Overlord* by the amalgamation of the HX and SC trade convoys into a single convoy system in order to release escorting warships for stepped-up anti-U-boat patrols. The

amalgamated system, which ran convoys in rotation at ten knots, nine knots and eight knots, thereby wasted the speed of the faster HX tankers when those tankers were included in nine-knot and eight-knot convoys.

(iii)

### Shortfall

Oil imports into Britain between June 1943 and May 1944 were higher than ever before; but they were neither high enough nor steady enough to satisfy the authorities. Contrary to what might have been expected of a period when the Allied tanker fleet was growing rapidly, the twelve months of preparation for *Overlord* were marked by the same fluctuations in supply as in earlier war periods. In the four months from June to September 1943 the medium-speed (HX) tanker fleet, helped by unexpectedly high surplus bunker deliveries, was able to maintain a rate of imports into Britain which was more than 25 per cent. higher than that of the last seven months of 1941, the previous import rate peak. By the end of October stocks in Britain were a mere 200,000 tons below the target level aimed at for *Overlord*—a fact which, incidentally, throws more light on the American reluctance to take risks and make sacrifices to hasten the build-up of fast 'Greyhound' deliveries to this country in the summer of 1943. Yet a bare six weeks later, the oil authorities in Britain were once more facing the anxieties of a prospective shortfall in supplies—and this despite the rapid expansion of 'Greyhound' arrivals which began early in December. In fact, between November 1943 and the end of March 1944 oil stocks in Britain fell by three quarters of a million tons.

Behind this dramatic change of scene lay the steady attrition of the fleet of HX and SC class tankers supplying this country. At the start of June 1943 there were 196 tankers sailing in HX and SC convoys between Britain and North America; at the beginning of December there were only 100. In the meantime many of the vessels had been diverted to supplying the West Mediterranean theatre, where the invasion of Italy had led to increased demands for oil and tonnage. In the second half of 1943 a growing number of tankers were being detained in the West Mediterranean theatre by naval authorities for operational reasons: to carry oil from the main ports of reception to the smaller advanced ports where they might be delayed by the need to 'lighten', or by having to wait for berths, or delayed to act as floating storage at such ports. Tankers were also held up

by administrative mistakes. Despite the new help given by supply from the Middle East, these Mediterranean developments meant that tankers had to be withdrawn from HX convoys supplying Britain and put into UGS (medium speed) convoys supplying the West Mediterranean. Between the start of September and the middle of December 1943 the number of tankers sailing in UGS convoys rose from thirty-seven to fifty-nine. These withdrawals to the Mediterranean came on top of unusually large movements of tankers from the Atlantic to replace or reinforce tankers in the Indian Ocean as a consequence of the reopening of the Mediterranean route; between June and October fifty-five tankers were put into eastern trades while only eight were brought back to the west.

These additional tanker requirements in the second half of 1943 were met largely at the expense of the tanker fleet available to supply oil to Britain. That fleet was at the same time being weakened by transfers of British-controlled tankers into American service. These transfers accorded with the principle of tanker pooling which the British had always advocated. The immediate occasion was a visit by Captain Carter to London in September 1943, when he was shown British estimates which appeared to indicate that there were actually too many tankers carrying black oils in United Kingdom trade. Not surprisingly the Americans promptly indicated that they could use surplus vessels elsewhere; they had a special need for smaller 'non-Greyhound' tankers in the Pacific, and also for carrying their growing imports of crude oil from South America. The British, in face of their own figures, could not resist the American suggestion that they should release some tankers, particularly since black oil stocks in Britain were so high that, at the end of October, it became possible to suspend imports of fuel oil by tanker and rely on surplus bunker deliveries alone. By 21st October twelve black oil tankers plying to this country had been allotted for Pacific service; later further transfers to the Americans were arranged.

It was in December 1943 that the British authorities first showed signs of anxiety about the supply prospects. The occasion was the presentation of a revised programme of import requirements by Allied Force Headquarters, Algiers, which foreshadowed the use of between two and three times as many ten-knot tankers in the UGS convoys. There was an immediate protest in London that the HX tanker fleet could not be weakened as much as this demand implied and the British in Washington 'strenuously' opposed an allocation of ten white oil tankers to convoy UGS.<sup>28</sup> The Americans agreed 'without prejudice' to reduce this number to six. By now London had come to the conclusion that the number of tankers in HX convoys would have to be increased and not just maintained if the *Overlord* stock target was to be met. They therefore asked Washington to press

Algiers to discharge and return tankers from the Mediterranean more rapidly.

The Americans were also perturbed about the tanker delays in the Mediterranean where there was growing evidence of administrative mishandling.<sup>1</sup> In December 1943 Captain Carter presided over a tanker conference at Algiers to which the Ministry of War Transport sent a representative. Among other measures this conference decided on the appointment of a tanker expert to the Petroleum Section at F.H.Q. Algiers. Meanwhile the British strove to alleviate the United Kingdom supply position by changing their supply arrangements east of Suez in order to release clean tankers from the Indian Ocean for the Atlantic. For example, they started to supply eastern Australia from the Caribbean instead of from the Persian Gulf, thus enabling more Persian Gulf white products to be sent to the West Mediterranean.

But the main British reaction was to press even harder for the building up of the fourteen-knot (CU) convoys to Britain. 'Greyhounds' had already been switched to the CU convoys from the fast tanker (OT) convoys to the West Mediterranean, and OT convoys accordingly went over from a monthly to a bi-monthly scale in November. In January 1944 London raised the question of withdrawing 'Greyhounds' from the Pacific. Mr. Wilkinson advised that nothing short of a directive by the Combined Chiefs of Staff could achieve this. However, the United States Navy was persuaded, after two months of discussion, to reduce, or postpone, the allocation of new 'Greyhounds' to the Pacific theatre. Meanwhile the United States Petroleum Administration for War showed itself as ready as ever to cut American domestic supplies for the sake of United Kingdom imports. 'Greyhounds' making 'shakedown' voyages up the United States east coast had hitherto been used only for carrying supplies for the American civilian market. Starting in January such new 'Greyhounds', unless found unfit to cross the Atlantic, were put straight into CU convoys on arrival at New York. Others launched north of Cape Hatteras sailed straight to the Caribbean in order to load for the United Kingdom. Later, the War Shipping Administration stopped allocating 'Greyhounds' to carry crude oil from Venezuela to the refineries of the north-eastern United States, replacing them with British-controlled tankers withdrawn from the Indian

<sup>1</sup> Tanker movements in the West Mediterranean were controlled by Field Headquarters Petroleum Section, Algiers, but this body was not always fully informed of what tankers to expect in the theatre. On 12th September the Ministry of War Transport representative at Algiers complained that vessels were being despatched into the theatre from both the east and the west before it had been ascertained that there was storage available to receive their cargoes. Instances of failings at executive level included one when two tankers went to Gibraltar instead of Bizerta because a message was deciphered wrongly. Tankers missed convoys because they were delayed unloading deck cargo; they failed to break off from convoy as appropriate for other ports of destination.

Ocean at the expense of British naval stocks at Trincomalee. It was not easy for the United States Petroleum Administration for War to renounce these tanker shipments to the north-east United States in the winter of 1943-44, since oil movements by land were falling short of expectation. Work on Little Big Inch, the 20-inch 'products' pipeline from Texas to New York and Philadelphia, was five months behind schedule; and deliveries by rail were dwindling as tank cars became worn out. Stocks in the east coast states fell sharply in the early weeks of 1944. But it was contributions from these sources which enabled the CU convoys to be built up so rapidly in the last six months before *Overlord*.

Looking back over the events of this fifth autumn and winter of the war it is apparent that United Kingdom oil supply arrangements had been complicated and thrown awry by a lack of balance within the tanker fleet sailing in HX (ten-knot) and SC (eight-knot) convoys. In September 1943 there had been an excess of tanker capacity available to carry black products, but a bare sufficiency—and eventually a shortage—of capacity that could be used to carry white products such as petrol or paraffin (which could not be shipped in tankers previously used for carrying heavier oils, except after an expensive cleaning process).<sup>1</sup> The measures that have just been described, and particularly the strengthening of the CU (fourteen-knot) convoys made good the shortage of white oil capacity to such effect that imports of these products into Britain reached a record 850,000 tons a month between February and May 1944.

But meanwhile, at the turn of the year, the authorities in Britain had begun to find themselves short of tankers to carry black products. The tanker transfers to the Americans which had disposed of the tanker surplus late in the autumn were followed by the normal winter seasonal rise in consumption of black oils. This was enhanced, in 1943-44, by special demands for derv fuel by the military, by larger than usual requirements of gas oil for the gas industry and, from the beginning of 1944, by extra needs for feedstock by the Heysham plant as a result of the decision to stop 'hydrobenzolisising' (i.e. mixing benzole with feedstock and hydrogenating both). The authorities responded with various expedients. One of these—shipment of gas oil in the deep tanks of 'Liberty' ships—has been already mentioned.<sup>2</sup> In addition, the tankers used to refuel the warships escorting CU squadrons began to carry part-cargoes of Heysham feedstock, and also of 'topped' oil for the bitumen refineries which were now working more fully to build up stocks for *Overlord*. The effect of these measures was offset, however, by the unexpected rise in bunker offtake in

<sup>1</sup> Seventeen tankers were cleaned by this process between April and August 1943.

<sup>2</sup> See p. 401.



the early weeks of 1944 when the 'Greyhounds' were taking on more fuel in Britain. An estimate made towards the end of February 1944 indicated that imports of heavy diesel oil and fuel oil would be more than 200,000 tons short of requirements during March and April. By March the authorities were ready to sacrifice white oil imports in order to improve black oil supplies by allocating one 'Greyhound' in each CU convoy to carry a black cargo. In the event, an average of two black oil tankers per convoy arrived between March and May 1944.

Between March and May 1944 oil imports into the United Kingdom reached a record of over 400,000 tons a week. But stocks were still well below target when *Overlord* was launched in the early days of June. Diesel and fuel oil stocks, indeed, were still well below their level of the previous October. White oil stocks, which were the main beneficiary of the recovery in import levels, were kept down by the unprecedented level of oil consumption in Britain in the last few months before D-day: in the spring of 1944 aviation spirit consumption, for the first time during the war, actually exceeded what was forecast. Accordingly, stocks of white petrol products continued to fall until March 1944. They were well below target level on 1st April—the original date chosen for *Overlord*—and still below target two months later when the Normandy landings took place.

(iv)

### Storage and Transport

At this point it should be evident that the twelve months preceding *Overlord* placed United Kingdom oil reception facilities under a greater strain than ever before. The fourteen-knot all-tanker 'Greyhound' convoys taxed the resources of the oil ports far more severely than the smaller 'bunches' of tankers arriving in the general trade convoys. Between March and May 1944 eleven CU convoys—averaging over nineteen tankers apiece—arrived in Britain; one of these, CU.24, was twenty-four tankers strong. The cycle of arrivals meant that the 'Greyhounds' could not be allowed to spend more than six days in United Kingdom coastal waters.

However, the rate of tanker turn-round in United Kingdom ports did not place a limit on the flow of supplies into this country after the middle of 1943 as it had done in late 1940: the improvements initiated in 1941 and 1942 to tanker facilities along the west coast now prevented port congestion. The questions the oil authorities had to ask

themselves at this time were the same they had faced in the autumn of 1941. Could the increasing volume of oil that would have to be delivered through the west coast ports to meet military and air force requirements be accommodated at installations on or near the west coast—bearing in mind the large stockbuilding programmes of the Services? And, if not, could oil be moved sufficiently rapidly to other parts of the country by overland or coastwise movements to keep the west coast installations free to receive incoming cargoes?

The answer to the first question was a negative one. During the summer of 1943 Shell-Mex House began to investigate supplies of white oil tankage along the east coast. Part of this had already been allocated to hold bulk reserves for the War Office and, to a lesser extent, for the Air Ministry.<sup>1</sup> Nevertheless there was found to be about 200,000 tons of white oil tankage that had been 'sterilised' (that is filled with water) for fire-fighting purposes or to provide 'fire-breaks' within installations. It was decided to recommission about 100,000 tons of this to house civil stocks. Later, Shell-Mex House also arranged to recondition another 40,000 tons capacity in the Thames Estuary that had been damaged by air attack.

This programme promised to reduce the strain on reception facilities along the west coast but it did not meet all the Air Ministry's requirements for housing its stocks. As previously noted, the Air Ministry had launched a programme to build 500,000 tons of new 'covered' storage—partly at the west coast ports, and partly at other points along the line of supply—which was due to be completed by the second half of 1944.<sup>2</sup> Now, following the *Trident* decision to expand the air offensive from Britain, the Ministry calculated that another 370,000 tons of capacity would be needed, not in 1944 but as soon as possible. In effect this gave the oil authorities no option but to stock more aviation spirit along the east coast. At a meeting on 8th October 1943 it was agreed that the Air Ministry should take over the greater part of the old surface installation at Thames Haven. This would meet about half its needs. To supply the rest Shell-Mex House undertook to convert black oil storage (of which there was plenty) to hold civil stocks of petrol, thereby releasing civil petrol tankage for the Air Force. This second part of the decision never had to be carried out, however. In November 1943 the Air Ministry reduced its stock target from six to four months forward consumption;<sup>3</sup> later, in March consumption estimates were reduced. As a result, by the spring of 1944, far from looking for more storage space,

<sup>1</sup> See p. 326.

<sup>2</sup> See p. 327.

<sup>3</sup> It did so because the 100-octane spirit supply position seemed to make it impossible to build up stocks equal to six months' consumption.

the Air Ministry was asking the Storage and Development Sub-Committee to consider whether part of its storage building programme should not be cancelled in order to release manpower and materials. The committee decided that work was too far advanced for this to be worth while.

There remains the second question posed above regarding Britain's inland distribution capacity. Here also, the answer looked to be a negative one. The decisions taken in 1942 and 1943 to hold bulk stocks of aviation spirit and petrol along the east and south coasts promised to place an excessive burden on the country's oil transport system after the middle of 1943. Already in the summer of that year, when imports reached record heights, that system was showing signs of strain. Railborne oil movements from the Bristol Channel ports had to be reduced owing to track congestion and Shell-Mex House was asked to move as much oil by road as possible. But the road tanker fleet was heavily engaged in delivering aviation spirit to airfields. As for coastal shipments there were still only twenty-four coastal tankers working in oil distribution. Indeed in June 1943 the Ministry of War Transport authorised the use of slow ocean tankers to ferry oil round to the east side of the country. The situation was not likely to get easier as *Overlord* approached. The railways in particular could hardly be expected to carry heavier cross-country oil traffic at a time when they would be carrying increasing military supplies from north to south.

The root cause of all these difficulties was the diversion policy introduced in 1940. This policy had been relaxed in 1941 when east coast installations had been fed direct by tankers making the long voyage in convoy around Scotland. But the drop in imports and the opening of the new pipeline from Avonmouth to the Thames made it possible to apply 'diversion' with all its early rigour in the eighteen months following Pearl Harbour. Between January 1942 and June 1943 some 94 per cent. of all oil imports (other than Admiralty imports) were received through the west coast ports. Now, in the second half of 1943, the British authorities began increasingly to favour relaxing the diversion policy a second time. The security arguments against doing so had lost much of their force since 1941. In October 1943 an important breach in the policy was made by the Storage and Development Sub-Committee when it was faced by the supply implications of the stepped-up bombing offensive against Germany. It was estimated that transport would be needed to move an extra 108,000 tons a month of aviation spirit to an area well to the east of the east Midlands 'bomber area', whose needs were being met by the Midland pipeline circuit. The additional transport facilities would be needed by the spring of 1944. Thames Haven where the Air Ministry was now proposing to hold bulk stocks, was

the convenient point of entry; there was in any case insufficient time to lay another pipeline across to the west coast. Accordingly the Storage and Development Sub-Committee sanctioned the construction of a pipeline system from Thames Haven into East Anglia. This comprised a pipeline running north-west from the Estuary to an Air Force depot at Saffron Walden, and then north-east to another at Hethersett, near Norwich—a total length of 125 miles; a spur from the line led to yet a third depot at Thetford. From Saffron Walden a branch pipeline linked the new system to the midland circuit at Sandy Heath, thus allowing each to support the other as need arose. A valuable feature of this network in East Anglia was that its pipelines passed within  $4\frac{1}{2}$  miles of sixteen existing or projected airfields connected to the main system by spurs. This greatly reduced demands on road transport.

The decision to supply aviation spirit in quantity through the Thames Estuary was the first breach since 1941 in the policy of 'diversion'. It was accompanied by a decision in the autumn of 1943 to allow tankers to sail independently around Scotland as far as the Forth. Two months later the British sought to widen the breach. In the beginning of December 1943 they asked the Americans to allow 'Greyhounds' to be used for direct east coast shipments. They met with a refusal. The Americans calculated that 'Greyhounds' diverted from west coast to east coast discharge would stay three times as long in United Kingdom waters. Since 'Greyhounds' brought in the greater part of Britain's oil imports during the next five months, this refusal meant that the policy of 'diversion' was broadly maintained right up to *Overlord*. Between July 1943 and June 1944 east and south coast oil imports averaged some 25,000 tons a week compared with under 9,000 tons a week during the previous eighteen months. But in that time the west coast oil ports of Britain still handled some 90 per cent. of oil imports other than Admiralty oil fuel. Fortunately the consequences for inland transport of this insistence of the Americans on west coast unloading were ameliorated by the decline in oil imports during the winter. When these recovered in the spring of 1944 coastwise shipments were able to take a larger share of the transport burden. For a period of two to three months the coastal tanker fleet at the disposal of Shell-Mex House contained sixty vessels with a capacity of 51,000 tons. It had been reinforced by small tankers brought from the United States—for use in the cross-Channel invasion—whose crews gained experience of British waters by helping in coastal distribution.

(v)

## Cross-Channel Supply

The months following June 1943 also saw plans to supply oil across the Channel brought to the final stage of preparedness. The most spectacular of these plans was the *Pluto* project—the plan to lay underwater pipelines from England to France—which the Petroleum Warfare Department was administering in conjunction with the War Office and the Admiralty. In June 1943 the British Chiefs of Staff directed that this project should be a ‘matter for immediate execution’.

It will be remembered<sup>1</sup> that two types of pipe had been developed for *Pluto* by the middle of 1943; hollow armoured cable (Hais) and welded steel pipe (Hamel). It was decided to utilise both. The aim was to provide a cross-Channel pipeline capacity of between four and five thousand tons a day—or between 40 and 50 per cent. of the expected total requirement of all oil products. The planners had in mind two distinct systems. One, given the code name *Bambi*, would be composed of six 3-inch lines of Hamel pipe and four 3-inch lines of Hais cable. This was to be laid from a point near Sandown Bay, on the Isle of Wight, across to the Cherbourg peninsula, a distance of some sixty-five sea miles. *Bambi* was intended to have a throughput capacity of some 3,500 tons a day, and was to be fed from the main English pipeline network through a twenty-two mile link pipeline between the Isle of Wight terminal and Fawley. The link pipeline was laid under a directive of the Q.M.G.’s Petroleum Committee issued at the end of July 1943. This meant that there would eventually be a direct pipeline connection from Avonmouth (itself connected to Stanlow via the North-South pipeline) and the initial lodgment area in France.

The second system, *Dumbo*, would be of no use in the first phase of operations but it had the advantage of being much shorter than *Bambi*. It was to run from Dungeness to Ambleteuse, near Boulogne, a distance of only twenty-five sea miles, and was to have a throughput of 3,000 tons a day. This was the maximum that could be achieved from the pipe and cable left over after the completion of *Bambi*, and involved using, in addition to 3-inch cable and pipe, all the 2-inch Hais cable that had been manufactured before it was found that 3-inch cable could be used.<sup>2</sup> Like *Bambi*, *Dumbo* was to be fed from

<sup>1</sup> See p. 335.

<sup>2</sup> The 2-inch cable was all allocated to *Dumbo* because its capacity was not big enough to make it worth laying all the way across to Normandy.

the Avonmouth–Thames pipeline. By the autumn of 1943 a seventy-mile-long link had been laid from Dungeness to the eastern terminal at Walton-on-Thames. Later, this link was connected by two small spurs to an Air Force depot at Wye and to Admiralty tankage at Rye. The Walton-on-Thames end of the link was also connected directly with the big installation at the Isle of Grain, where the War Office was planning to hold 110,000 tons of petrol stocks. The line between Walton-on-Thames and the Isle of Grain had two great advantages: it connected the *Pluto* system with yet a third main importing centre and also relieved the railways of the burden of filling up the Isle of Grain storage from the west coast. This meant that petrol could be pumped from Avonmouth across to the Thames Estuary through the old Avonmouth–Walton-on-Thames pipeline, where capacity was now raised from 80,000 to 135,000 tons a month. The whole complex of land pipeline schemes connected with *Pluto* was finished by the end of March 1944.

The *Pluto* scheme tied up large material resources. The shipping involved, for instance, was considerable. Apart from cable laying ships there were ultimately six large steel drums (Conuns) for laying the Hamel pipe and the tugs to tow them. Five cable barges also had to be provided for handling the ‘shore ends’ of the Hais cable. Yet *Pluto* was never treated as an integral part of the supply plan. It was regarded only as a project which had an excellent chance of succeeding; and, if it succeeded, as one which would provide a welcome bonus supply system. As explained in Chapter XV the Allies were planning to provide for all their cross-Channel oil needs through the orthodox method of tanker shipments. This also called for considerable preparation.

The main problem considered was that of getting the tankerborne oil ashore on the other side. There was great uncertainty about reception facilities that the Allies would find available there. In the initial stages of the assault all oil supplies would go across in containers; since 1942 a military stock of 250,000 tons of packed petrol and derv fuel had been accumulating in Britain. But the intention was to switch over to bulk supply within a few days of landing, when oil port facilities capable of receiving ocean tankers were unlikely to be available in working order. The problem was thus to find ways of landing oil in bulk at small ports, or even outside ports altogether.

One answer was to use a fleet of very small tankers, some of which might be discharged into concrete barges used as floating storage. The months before *Overlord* were a period of intensive small tanker building. The Americans began to manufacture a large number of 600-ton tankers (‘Y’ tankers); these came over to Britain in substantial numbers during the spring of 1944, and were used temporarily for coastal shipments. The British, for their part, had a

programme to build thirty 400-ton carriers which could ship petrol either packed or in bulk. An estimate in the autumn of 1943 suggested that 150 of these 'Chant' tankers would be required, some by the Navy for use as water carriers and other auxiliary purposes. There was clearly no chance of building that number in Britain in time for *Overlord*, but the British did what they could. A new crash programme was started to build another thirty-nine 'Chants'. Because of the shortage of shipyard space a majority of these were prefabricated inland. However, even this reduced target of sixty-nine 400-ton tankers proved well out of reach. By the end of May 1944 only thirty-seven 'Chants' had been completed.<sup>1</sup>

Meanwhile the authorities were also pressing ahead with plans to discharge ocean-going tankers off the open shore. The Planning Staff put great hopes on this scheme which was given the code name, *Tombola*, and was to go into effect within nine days of the landings. The idea was to put down moorings for ocean tankers about a thousand yards off shore and to connect them with shore storage through submerged or floating pipelines. *Tombola*, like *Pluto*, was a completely new and untested idea and a practice run was held near Poole in March 1944. Specifically, it was intended to lay two sets of moorings to the east and west respectively of Port-en-Bessin, a small fishing port to the north-west of Caen. Work on these moorings was to start five days after D-day and to be completed four days later. In addition moorings for two other tankers were to be laid near the western extremity of the Grande Rade of Cherbourg as soon as possible after the fall of that port.

The preparations for *Overlord*, so far as oil supply was concerned, had been comprehensive and ingenious. How oil problems developed and were met during that operation will be described in Chapter XX.

## CHAPTER XIX

### PROBLEMS OF PARTNERSHIP

(i)

#### Tankers and Trades

**O**VERLORD, the long-awaited invasion of the Continent, began in the early hours of 6th June 1944. The campaign lasted just under twelve months and was accompanied by major Allied offensives in the Mediterranean and the Pacific. Right on the eve of the Normandy landings, the Allies in the West Mediterranean theatre occupied Rome and, two months later, Florence as well. Thereafter Allied resources were diverted to *Anvil*—the landings in Southern France which began on 15th August. Meanwhile, on the other side of the world, the Americans followed up their spring campaign in the Marshall Islands with an assault on the Marianas, launched only four days after *Overlord*. In September 1944 they took Ulithi Atoll in the North Caroline Islands, and from this base invaded the Philippines the following month. The conduct of these major operations concurrently brought up oil demands by the military to new heights. Between June 1944 and May 1945 the Americans, so far as can be calculated, seem to have shipped over 21 million tons of oil products to the Pacific war fronts. As much again was received from across the Atlantic at British and north-west Continental ports; and another 9-9½ million tons went to the West Mediterranean theatre from the western hemisphere and the Middle East.

These shipping requirements were met by a total Allied tanker fleet which grew from 16.9 million deadweight tons at the end of May 1944 to 21 million deadweight tons at the end of May 1945—an increase of 4.1 million deadweight tons compared with a rise of 4.2 million in the twelve months preceding *Overlord*. The balance between losses and new launchings was much the same in the two periods as Table 37 shows, but the Allies acquired a number of French and Italian tankers as a result of operations in the earlier period.

The table reveals that tanker losses were even lower in 1944-45

<sup>1</sup> Six were completed later. Twenty-two more still building were converted to dry-cargo vessels.

than in 1943-44. They fell lowest during the early stages of the invasion of the Continent—the period when a major assault on Allied tankers might have been expected. The tonnage of new tankers launched was also lower in 1944-45 but a much greater proportion was 'Greyhound' tonnage than in 1943-44, when construction figures were inflated by the launchings of 'Liberty' tankers. In consequence the potential carrying capacity of the Allied tanker fleet grew much more in 1944-45 than in the previous twelve months.

TABLE 37  
Tanker Losses and New Building\* 1944-45

	000 d.w. tons			
	Losses†	New Building		
	Total	Total	'Greyhounds'	Other
June 1943-May 1944	486	4,522	3,479	1,043
June-August 1944	37	1,048	1,014	34
September-November 1944	100	1,110	1,086	24
December-February 1945	96	1,140	1,095	45
March-May 1945	65	998	952	46
June 1944-May 1945 Total	298	4,296	4,147	149

\* Tankers of 1,600 gross tons and over, including tankers owned by the Admiralty and the Navy Department, whalers, etc.

† Includes war losses and marine losses.

Table 38 opposite shows how that tanker fleet was employed during the final year of the war. The distribution reproduces the pattern of the previous twelve months, with some accentuation in parts. For instance, the amount of tonnage supplying the Indian Ocean countries remained at much the same level throughout the period and was little different from the average during the previous twelve months. But the amount absorbed in the Pacific war theatre grew more rapidly in the final year of war than it had done in the earlier period; even before the war with Germany was over the Pacific theatre was using almost as much tanker tonnage as both the main European theatres together. The absence of port facilities in the Pacific islands meant, as in the Mediterranean, that tankers had to wait before unloading, and were often held in forward areas to act as floating bulk storage. But in any case round-voyage times would have been long because of the enormous distances that had to be covered. When in the middle of 1944 the Americans captured the Marianas they opened up a shorter and more direct route across the Pacific from Pearl Harbour to the Philippines; even so the distance was between two and three thousand miles further than that from New York to Britain. The earlier routes across the South-West Pacific

TABLE 38  
Employment of Tanker Tonnage,\* analysis by Destination 1944-45  
(1,600 gross tons and over)

	Total United Nations Fleet (1)	North-West Europe (2)	Western Mediterranean (3)	Pacific (4)	United States north eastern seaboard (5)	Other western hemisphere (6)	Indian Ocean (7)	Tankers on fleet attendance (8)	Tankers immobilised by damage, repairs, reconditioning or refitting (9)
End of May 1944	16.9	3.3	1.4	2.0	2.0	2.0	1.8	2.2	1.7
End of April 1945	20.8	3.5	1.4	4.8	2.3	2.1	1.9	2.5	1.7
† May-August 1944	17.4	3.5	1.4	2.6	2.1	1.9	1.9	2.2	1.4
† August-November 1944	18.4	3.2	1.2	3.6	2.1	2.1	1.9	2.3	1.6
† November-February 1945	19.5	2.7	1.5	4.3	2.3	2.1	1.9	2.4	1.7
† February-May 1945	20.6	3.2	1.3	4.7	2.5	2.0	1.9	2.5	1.7

millions of d.w. tons

\* Includes tankers in the control of other nations working to supply countries which Allied-controlled tankers would otherwise have had to supply. † 4 month average.

(1) Includes depot ships, some non-ocean tankers and tankers about which information is incomplete, which are not included in subsequent columns. (2) British Isles, S.H.A.E.F., Iceland and North Russia.

(3) Includes West Africa and Azores.

(4) Includes Vladivostok, supplied by a few American tankers transferred to Soviet flag.

(5) Atlantic coasts of United States and Canada. It covers all tonnage plying to and from the Gulf and Caribbean ports to the north eastern seaboard, but excludes movements from one part of the eastern seaboard to another. These are covered in the following column.

(6) Includes some tankers engaged in intra-theatre movements in the Pacific and Mediterranean which cannot be isolated from local movements in the western hemisphere.

(7) This includes the Middle East as far west as Libya, East Africa, South Africa, India and Ceylon and 'British programme' tonnage supplying Australia and New Zealand. It includes tankers supplying the area from outside as well as from the Persian Gulf.

(8) Including tankers on fleet attendance immobilised for repairs.

(9) Excludes immobilised tankers on fleet attendance duties.

and around Australia were very much longer. In February 1945 it was reported that tankers were taking up to thirty days to complete a round voyage merely between Australian ports and the forward base on Manus Island.

Tanker employment in the routes off the east coast of North America also showed a continuing upward trend. From 1.6 million deadweight tons in May 1943 the tanker tonnage supplying the eastern seaboard had risen to over 2 million by the middle of 1944; between June 1944 and May 1945 it averaged 2.5 million deadweight tons. The reasons for this increase were much the same as in the previous twelve months. Imports of black petroleum products from the Caribbean refineries went on rising, and in the middle of 1944 a decision was taken to ship additional Caribbean crude oil to the east coast American refineries. By July 1945 the throughput of these east coast refineries was well over 40 per cent. greater than before Pearl Harbour, and almost twice as great as in 1942.

These shipments from the Caribbean were a response to growing demands in the north-eastern states both to supply the New York Navy Pool and to meet a rising bunker offtake. Shipments from the Gulf ports also increased particularly sharply during the final year of the war, as the following table shows.

TABLE 39  
*Movement of Petroleum from Gulf to East Coast States 1942-45*  
000 barrels a day

	July 1942- June 1943	July 1943- June 1944	July- December 1944	January- June 1945
Railways	839	765	551	504
Pipelines	157	480	696	733
Inland waterways	114	124	135	127
Total overland	1,110	1,369	1,382	1,364
Shipments by tanker	118	226	312	451
Total movement	1,228	1,595	1,694	1,815

Source: John W. Frey and H. Chandler Ide, *op. cit.*, Tables 23 and 24.

As Table 39 makes clear the increase in movements by tanker was made necessary by the failure of overland movements in the United States to rise very much after the middle of 1944. There was a growth in pipeline deliveries—not surprisingly since both Big Inch and Little Big Inch were delivering their full capacity of some 560,000 barrels a day throughout the period. But, to counter this contribution, there was a drop in the throughput of other pipelines

and, more important, a big decline in railborne deliveries. Ever since the middle of 1943 the strength of the rail tank car fleet supplying the north eastern states had been dwindling. This was partly because of maintenance problems but mainly because cars were withdrawn from it in order to carry black products—and, later, crude oil as well—from the Gulf to California where the production from local oilfields could no longer keep pace with the mounting demands of the Pacific theatre. Between August 1944 and July 1945 over 12,000 tank cars on average were employed for these west coast supplies. The number carrying oil to the north-east fell from 65,000 cars in the spring of 1944 to an average of only 53,000 in the twelve months from July 1944.<sup>1</sup>

In the two European war theatres tanker requirements also continued to rise, but, as in the previous year, they rose much less than in the Pacific. On average an extra 300,000 deadweight tons of tankers were used to supply the West Mediterranean theatre, where oil imports were 2 million tons higher in the final year of the war against Germany. Supplies from the Middle East refineries amounted to some 2½ million tons, of which about one-third came from Haifa. Judging by the tonnage involved in these shipments (the only basis for comparison available) this contribution from the Middle East was not noticeably greater than in the previous twelve months.<sup>2</sup> Following the expansion of its capacity undertaken in 1943 Haifa's output of refinery products rose to exceed 3.5 million tons in June 1944 to May 1945; and the throughput of Abadan was also greater. But this enlarged output was partly offset by the ending of fuel oil supplies from the 'topping' plant at Kirkuk.<sup>3</sup> The benefit of Abadan's output accrued, not to the West Mediterranean but, directly or indirectly, to the South-East Asia and Pacific war theatres. The extra imports, mainly petrol and aviation spirit, brought into the West Mediterranean theatre in the final twelve months of the European war were all shipped from the New York Navy Pool.

The oil demands of the United Kingdom theatre were increased by military operations on the Continent in the final year of the war against Germany. Tankerborne imports during June 1944 to May 1945 were some 4.7 million tons greater than in the previous twelve months; but the average tonnage employed<sup>4</sup> was no more than 230,000 deadweight tons greater. This striking increase in efficiency came about despite the fact that more supplies—both absolutely and

<sup>1</sup> For a fuller account, see John W. Frey and H. Chandler Ide, *op. cit.*, Ch. VII.

<sup>2</sup> Tonnage shipping oil from the east Mediterranean to the west Mediterranean averaged 99,000 deadweight tons in June 1944 to May 1945 as compared with 71,000 deadweight tons between June 1943 and May 1944.

<sup>3</sup> See p. 380.

<sup>4</sup> Excluding tonnage employed in coastwise movements and making shipments from Britain to Iceland.

relatively—were picked up from Gulf and Caribbean ports than in 1943–44. This development can be attributed in part to the increased role of the fast and efficient ‘Greyhound’ tankers. These tankers were responsible for shipping to the United Kingdom some 56 per cent. (11.6 million tons) of tankerborne oil supplies compared with 38 per cent. (6.2 million tons) in the earlier period. There was also a further improvement in the operating efficiency of both ‘Greyhounds’ and ‘non-Greyhounds’ working in the United Kingdom programme. The accompanying table analyses the round-voyage times of tankers lifting oil from the north-eastern seaboard of the United States in 1944–45, and gives comparable figures for 1943–44.

TABLE 40  
*Average Tanker Round Voyages 1943–45*

	June 1943– May 1944 Days*	June 1944– May 1945 Days*
<i>‘Greyhound’ Tankers</i>		
Total voyage†	35	32½
In Atlantic	22½	22½
In American waters	7½	5½
In United Kingdom waters	5½	4½
<i>HX and SC Class Tankers</i>		
Total voyage†	48½	47½
In Atlantic	31½	31½
In American waters	8½	7½
In United Kingdom waters	8½	9

\* Rounded to the nearest quarter of a day.

† Tonnage importing naval fuel under Admiralty direction is not covered by these figures. This tonnage was almost all of HX or SC class.

The table shows a notable reduction in the time spent by all classes of tankers in American waters.<sup>1</sup> In the case of ‘Greyhounds’ it also shows a useful fall in voyage time spent in United Kingdom waters. An important contributory factor was an improvement in port turn-round times which accompanied a decline, in this final stage of the war, in the time spent by tankers on short repairs. The main beneficiary in United Kingdom ports were, of course, the mainly British-controlled HX class tankers; their average turn-round time fell from 5.4 days in 1943–44 to 5 days in 1944–45. However this gain was offset, so far as the figures in the table are concerned, by the unusually large number of HX class tankers sent northabout to the Thames Estuary during the summer of 1944.

<sup>1</sup> Time spent in American waters refers to time elapsing between the arrival of the tanker at its first American port and its departure for the United Kingdom from last American port.

Tankers in American waters also benefited from the relaxing of restrictions on their movements there. This was particularly helpful to the ‘Greyhounds’ fetching cargoes for Britain from the Gulf and Caribbean; these tankers spent an average of only twelve days in American waters in 1944–45 compared with sixteen days in the previous twelve months. An important factor delaying coastal movements was time lost in waiting for convoys. This was also reduced in the second half of 1944 by the more frequent departure of convoys. In June the ‘Greyhound’ (fourteen-knot) convoys changed over from a nine to an eight-day cycle. From the autumn the HX (ten-knot) convoys, which had been operating on a seven to eight-day cycle, went over to a five-day cycle.<sup>1</sup>

A noteworthy development in September 1944 was the reopening of the English Channel to through shipping. This meant that tankers could sail to Britain’s east coast ports as quickly as they could to those on her west coast. From October 1944 ‘Greyhound’ tankers began to take advantage of this. The reopening of the Channel also made it possible for outward-bound vessels to shorten their voyages by assembling for convoy at Falmouth, and sailing south of Ireland instead of north of it, as they had done since 1940.

(ii)

### A Question of Priorities

On the eve of *Overlord* the framework of Anglo-American oil co-operation was almost exactly what the British wanted and had been patiently negotiating for ever since Pearl Harbour. There were no inter-Allied executive bodies on the Anglo-French model to infringe on London’s executive control over British oilfields, refineries and tankers; bodies which would certainly have become dominated by this time by the United States instead of Britain. From the ashes of the Combined Shipping Adjustment Boards had arisen the twin Allied Tanker Co-ordinating Committees sitting in Washington and London, which had met for the first time on 1st May and 6th June 1944 respectively. But the British had seen to it that these committees were given no executive powers whatever. Indeed the

<sup>1</sup> HX (ten-knot) and SC (eight-knot) trade convoys were amalgamated in the spring of 1944 to release escorts for U-boat hunting. They then ran on a schedule of three convoys every 22½ days at speeds of ten, nine and eight knots respectively. In September, when the five-day cycle was introduced, they ran at speeds of ten, ten and eight knots. In October the eight-knot convoy was replaced by a ten-knot convoy and the SC convoys began to run again from Halifax on a fifteen-day cycle, shortened to a ten-day cycle in February 1945.

committees were hard put to find any role at all. Meeting less than once a month as mere forums for discussion, they could add nothing, as the British had foreseen, to the close informal collaboration in tanker problems already existing between British and American officials in the two capitals. In the end, almost fortuitously, the committees found a part to play. During the build-up for the assault on Europe a growing number of aircraft and military vehicles (which, by reason of their bulk, wasted deadweight carrying capacity when carried on dry-cargo ships) were shipped across the Atlantic on tanker decks; in May 1944 alone eleven hundred aircraft reached Britain transported in this way—mostly by 'Greyhounds'. The civilian tanker agencies—the War Shipping Administration in Washington and the British Ministry of War Transport—dilisked this practice intensely since, apart from displacing oil cargo, the loading and unloading of the aircraft led to delays in tanker turn-round.<sup>1</sup> In the spring of 1944 ten aircraft that had been shipped to North Africa were returned to the United States to avoid a ten-day unloading delay. This incident evoked a sharp reaction from the American military who had the support of the Combined Chiefs of Staff in demanding a greater say in the control of tanker movements. To ward off this pressure, the Allied Tanker Co-ordinating Committees invited the United States Army to send a representative to their meetings. The committees thus came to perform a useful service as a forum where the conflicting requirements of oil and deck-cargo shipments could be examined and reconciled. The conflicting points of view were not, it may be noted, on national lines.

Yet while there was no supra-national machinery there was an increasing flow of information between London and Washington about oil, and particularly tanker matters—and this was just what the British had sought. The emergence of the first combined Oil and Tanker Programmes in the autumn of 1943 and the spring of 1944 has already been described.<sup>2</sup> The combined programmes made it possible for the oil authorities on both sides of the Atlantic to relate their plans for oilfield and refinery production—and also the level of tanker building—to the strategy planned for 1944 and 1945. In a further programme which was produced in the autumn of 1944 the working parties were able to present the oil and tanker implications of the war strategy for 1945 and 1946 on the basis of two alternative hypotheses; namely, that Germany was still fighting in 1946, or that the war was against Japan alone. In the spring of 1945 another combined programme was produced. Among other findings

<sup>1</sup> Down to May 1945 tankers sailing to Britain carried 13,719 aircraft and 2,132 gliders as deck cargo. They also carried over 70,000 tons of vehicles. Of these 4,650 aircraft and gliders were carried in HX convoy speed tankers and 679 in SC convoy speed tankers.

<sup>2</sup> See p. 369.

this programme revealed a potential shortage of paraffin, now required as a fuel for jet aircraft and—for the first time in the war—a temporary surplus of tankers.

The United Nations Oil and Tanker Programmes were also helpful in the short-term management of tankers since they provided a yardstick against which performance on each route could be assessed. But there was also an important increase in direct information about tankers during the second half of 1944. Since August 1942 'employment returns' showing the tonnage on each route had been issued monthly in Washington under the warrant of the Combined Shipping Adjustment Board. From March 1944 the United States War Shipping Administration, armed with new knowledge about military shipments, was able to issue a monthly return of shipments carried out by United States-controlled tankers, classified into 'military', 'civilian' and 'lend-lease' cargoes. But the main contribution came from a mixed American and British team working in Washington to provide information about tanker activities. This was the working staff of the Washington branch of the Allied Tanker Co-ordinating Committee—which thus fulfilled the hopes entertained by the British the previous year that it might throw more light on tanker handling in the Pacific. This combined working staff produced a weekly summary of the distribution of tankers in various 'trades' classified by tanker speed and 'control' (that is, British, American or neutral). Beginning in September 1944 it published a monthly return of shipments made over the preceding three months by all Allied tanker tonnage to all areas. This could be directly compared with the forecast for the same quarter in the combined oil and tanker programmes, thereby showing how far performance was living up to expectations.

The working staff in Washington, which was much the most useful part of the Allied Tanker Co-ordinating machinery, was thus able to provide a sustained appraisal of tanker handling in all parts of the world, and to spotlight inefficiencies. The British had recognised the absence of this sort of information as the major obstacle to effective tanker allocation during 1942 and 1943. Experience now showed that information could remove suspicions—but not disagreement. On the contrary, in this final stage of the war the differences in national standpoint (a natural consequence of the differing strategic circumstances of the two partners) placed their working relationship under a greater strain than ever. In the summer of 1944 the American Chiefs of Staff organisation, spurred by the growing competition between the 'British' and 'American' war theatres for supplies—and therefore for tanker tonnage—began not only to dispute British claims but to call into question the principles on which those claims were based.



This challenge grew out of clashes of opinion that had sprung up first in 1943<sup>1</sup> over the allocation of 100-octane spirit. Since the autumn of 1943 the British had been striving to get the Americans to grant an absolute priority for the achievement by D-day of the United Kingdom stock target. Mr. Wilkinson, who led the struggle in Washington, deployed an ingenious and powerful argument based, in part, on the concept of the 'working stock', meaning the oil unavoidably absorbed in the distribution system (storage tanks, pipelines, road and rail tankers) while supplies were moving forward. He argued that the only part of stocks which gave cover against the interruption of supplies—in other words the only part that truly constituted a strategic reserve—was the part of total stocks which exceeded this 'distributional minimum'. This was a particularly cogent argument for the building up of United Kingdom stocks, since it reinforced their strategic claims to special treatment with a cogent practical point. The United Kingdom distribution system for aviation spirit—with no less than 675 airfields as its outlet points in the summer of 1944—was more complex than that of any other theatre and therefore absorbed a bigger 'working stock'. In June 1944 London estimated the 'distributional minimum level' for 100-octane spirit at 1,050,000 tons. General Arnold, the United States Army Air Force Chief of Staff, who was visiting this country at the time, was told that operational flying might have to be curtailed if United Kingdom 100-octane stocks fell below that figure.

General Arnold was impressed; and he sent appropriate orders back to Washington. American air training was cut down to release extra supplies for Britain. Even so the Aviation Petroleum Products Allocation Committee was unable to meet British requisitions for this country during June, or in the following two months; nor indeed, did it prove possible to arrange for the shipment of all supplies actually allocated. Late in July the British Chiefs of Staff made another approach to their American opposite numbers, asking for the 'highest priority' to be given to shipping the balance outstanding from A.P.P.A.C's June and July allocations. Otherwise, they said, there would 'in all probability' have to be some curtailment of air support for the operations on the Continent.

Unfortunately, the working stock argument had by then been refuted by events. United Kingdom stocks of 100-octane spirit had already fallen far below this so-called 'distributional minimum' and the American Chiefs of Staff replied, therefore, that they saw no danger of operations having to be curtailed. In response to a further British approach in August, they remarked that experience had now clearly shown that air operations could be conducted from Britain

with a stock well below 1,050,000 tons. In August, as it happened, some limited restriction of aviation spirit consumption had been imposed in Britain for the first time in the war. But it could not be denied that operational flying time had not, in hard fact, been affected. Considered from a purely tactical point of view the British, in fixing the 'distributional minimum' level so high, and in making such an issue of the need to maintain it, had committed an error; and they were to pay dearly for it.

For the Americans were now beginning to question not just the level of 100-octane spirit stocks, but the whole of British stockbuilding policy. The American Chiefs of Staff had already shown how their minds were moving in May 1944 when the Army-Navy Petroleum Board, caught between tanker demands from the Pacific and strong British counter-pressure, had asked for guidance. The American Chiefs of Staff had then ruled that American-controlled tankers should be allotted to build up United Kingdom stocks within the existing target levels only to the extent that this was compatible with the maintenance of approved war operations in the United Kingdom and the Pacific. In other words theatre stock targets were to be treated not as mandatory objectives, but merely as desirable ones, and never to be achieved at the expense of operational needs in other theatres. Subsequently the American Chiefs of Staff went further in questioning the validity of the United Kingdom stock target, even though this had been reduced by half a million tons following the successful mounting of *Overlord*. Even the reduced figure, they thought, laid an excessive claim on tanker resources now that it was clear that the U-boats could no longer seriously interfere with sea communications.

In July 1944 the United States Chiefs of Staff took an initiative which they hoped would settle the question of priorities once and for all. In a paper to the Combined Chiefs of Staff they offered a formula for calculating the stocks appropriate to the particular circumstances of each war theatre. This started from the principle that stock levels should be related to expected consumption. It accepted the view that holdings in each theatre were composed of 'operating stock' and an 'emergency reserve', and suggested that the size of the operating stock could be calculated on the basis of the maximum number of days 'normally elapsing between sustaining shipments'. This time, experience showed, could be taken to be thirty days for all theatres (except those whose ports became ice-bound). As for the size of the 'emergency reserve', this could be calculated on the basis of the average number of days needed to make an emergency replacement to a theatre's point of consumption from its normal supply ports. The conclusion derived from the formula was that each theatre should maintain a stock of each oil product calculated as equal to

<sup>1</sup> See p. 280 *et seq.*

between sixty and eighty-five days of forward consumption, depending on distance from points of supply and the efficiency of internal communications. The intention was that these forward consumption figures should be maximum levels; any surplus supplies that became available were to be stored at loading ports and not in theatres. If target levels could not be reached then each theatre was to bear its proportionate share of the shortage—unless the Combined Chiefs of Staff decided that one of the theatres should be given priority on strategic grounds.

The implications of this document were considerable. The formula took away the claim of the United Kingdom theatre to special treatment because of its large and complex distribution system—this indeed was one of its merits in American eyes. It also placed the United Kingdom at a disadvantage compared with the Pacific theatre since the United Kingdom was nearer to the sources of supply and had a more sophisticated internal system. In fact the formula allotted to Britain and the *Overlord* area combined an 'emergency reserve' equal to only thirty days consumption. Finally the document challenged directly the long-established British policy of building up stocks when the going was good in order to survive during leaner periods. In practical terms the proposed formula implied that stocks in Britain and on the Continent combined should never exceed 4.65 million tons. The existing British stock target was 7.3 million tons. Throughout the war oil stocks in Britain had never fallen as low as 4.65 million.

The American Chiefs of Staff organisation was not content just to put forward this radical new approach to the stock levels question. They also sought, for good measure, to set up machinery which they could use to enforce the reduction of stocks in British theatres to the levels they had suggested. Early in September, in another paper to the Combined Chiefs of Staff, the American Chiefs of Staff proposed that each war theatre, whether 'British' or 'American', should submit monthly returns of stocks and past consumption to the Army-Navy Petroleum Board. The Board, as the agent of the United States Chiefs of Staff, was to 'screen' all demands for American-produced oil against these theatre stocks, and redistribute any excess. In other words a body without any British members would acquire the same kind of control over oil supply in general as the Combined Munitions Assignments Board exercised in regard to critical aviation oils. This would have placed oil stocks in the United Kingdom at the mercy of the United States Service Chiefs. In support of this disingenuous proposal its authors pointed to the 'acute supply situation', which was said to call for 'better and more complete planning and control of the supply and distribution of petroleum products'.

The British were able to get this proposal shelved. But they did

not find it so easy to resist the American proposals on stock levels. Among themselves the British criticised these proposals fiercely. 'My whole reaction to this paper', commented Mr. Wilkinson, 'is that it is entirely theoretical and simply stinks of amateurishness'. Thirty days cover for emergencies was 'military madness'; and the suggestion to fix an upper rather than a lower limit on stock levels was quite contrary to established trade practice. It would prevent favourable supply opportunities from being exploited; and possibly interfere with the operation of refineries by filling up their storage with products deliberately held back.

Much as they disliked these American ideas, however, the British knew better than to reject them out of hand. Instead, their approach was to accept them in broad outline but then try to negotiate special treatment for areas, like the United Kingdom, where the formula would not give an answer consistent with their own view of the stock levels needed. The British also worked to transfer the discussion out of the United States Chiefs of Staff organisation and into friendlier channels. In August a paper from the British Chiefs of Staff agreed on the need for a general review of stock levels, but suggested that 'rigid mathematical formulae' could not adequately take account of local circumstances. They also suggested that the question should be discussed with an Army-Navy Petroleum Board Mission which was due to come to Britain later that month and to this the Americans agreed.

British tactics were crowned with success. The American party, led by Rear Admiral (formerly Captain) Carter and Brigadier-General Peckham of the United States War Department, arrived in Britain in the third week of August 1944. When, late in September, they left for home, they took with them a draft agreement on stock levels which conceded all the points to which the British attached importance. The American formula was accepted as the proper basis for determining stock levels (except for lubricants and greases); but it was to determine *minimum*, not *maximum* reserves. It was agreed that stocks could be accumulated in theatres as the tanker situation permitted. In addition special treatment for the United Kingdom theatre was provided: its target stock, (expressed in terms of quantity rather than forward consumption to conform with the traditional practice of the Admiralty) was confirmed at 7.3 million tons, including 1,050,000 tons of 100-octane spirit. Finally, it was laid down that priorities between theatres should only be determined by the Combined Chiefs of Staff if the usual allocation agencies (in other words Admiral Carter and Mr. Wilkinson) were unable to rectify supply difficulties themselves. This meant that oil supplies for British theatres would be protected from interference by the discontented members of the United States Chiefs of Staff organisation.

This was a British success—but it was a success too complete and too obvious to last. The American Chiefs of Staff refused to approve the draft agreement arrived at in London. Instead, in December 1944, they resubmitted their original proposal, unchanged except for a few minor concessions. The American Chiefs of Staff followed this by new measures to ensure that they got their own way. In the past the British, in defending United Kingdom stock levels, had received a good deal of support from the American Services stationed in this country. The United States Chiefs of Staff now issued a directive forbidding American military officers in war theatres to associate themselves with opposition to any proposals put forward by Washington. The American Chiefs of Staff also brought pressure to bear through the lend-lease authorities. On 7th December 1944 these authorities told the British that oil would only be available on lend-lease terms to the extent that supplying it did not conflict with the stock policy of the United States Chiefs of Staff. Finally, the Americans initiated a major change in the machinery of supply with the ‘one dominant object’, as Mr. Wilkinson put it later, of finding ‘a means, month after month, to cut us down in our oil supplies’. They did so by giving new significance to a procedure that had been evolved in 1941 as a by-product of lend-lease accounting.

It will be recalled that when responsibility for handling commodities under lend-lease was distributed between United States government departments in 1941, the task of oil procurement had been given to the Navy Department. In the exercise of this responsibility that Department had been submitting, ever since June 1943, monthly statements of oil supplied and shipped under lend-lease to the Navy sub-committee of the Combined Munitions Assignments Board. This Munitions Assignments Committee (Navy) approved these ‘assignments’ in the same way as the parallel Munitions Assignments Committee (Air) approved the monthly assignments of critical aviation fuels by A.P.P.A.C. But despite their formal similarity there was a significant difference in the two procedures. Whereas the approval of the Munitions Assignments Committee (Air) was given in advance and was part of a genuine process of allocation, that of the Munitions Assignments Committee (Navy) was given retrospectively and automatically. Indeed the whole procedure had been originally accepted by the British on the understanding that it was no more than a formality.

Early in 1944 however, the American Admiral who was Chairman of the Munitions Assignments Committee (Navy) began trying to persuade other American agencies to agree that this retrospective assignment by his committee should be converted into assignment in advance. On 19th December 1944 he abruptly took matters into his own hands. Summoning his committee at short notice he announced

that the retrospective procedure was illegal and could not be justified before the new Congress (elected in November 1944). In future the Munitions Assignments Committee (Navy) was to approve all lend-lease oil deliveries before they were made. He then put forward a set of oil allocations for January shipment to the United Kingdom which were far less than the British had asked for, and which had been calculated, they suspected—though this was denied by the American side—in accordance with the United States Chiefs of Staff formula for stock targets. These allocations, it was said, were for immediate approval ‘to enable shipments to proceed’. The allocations were approved against British opposition which was carried into the Combined Munitions Assignments Board. That body ruled that the approval should be regarded ‘as tentative, subject to revision’ after the British oil experts had looked at them. The same procedure was repeated the following month.

Meanwhile the British put up a strenuous opposition. Having, as they saw it, resisted at least three previous attempts to bring United Kingdom oil supplies under the control of the American military establishment they had no intention of submitting tamely to the fourth. The British considered the possibility of constituting Admiral Carter, Mr. Wilkinson and a representative of the Petroleum Administration for War as a specialist advisory sub-committee, linked directly, like A.P.P.A.C., to the Combined Munitions Assignments Board machinery. But this was a ‘fall-back’ position, kept strictly among themselves. At the meetings of the Combined Munitions Assignments Board the British team maintained a stiff front. They reminded the Board that the connection of the Navy Department with oil supply was a purely adventitious one arising out of the lend-lease arrangements. They remarked that the membership of the Munitions Assignments Committee (Navy) had little personal knowledge of petroleum problems and had no expert guidance like that which was given by A.P.P.A.C. to the Munitions Assignments Committee (Air). For this reason the Navy committee was not really competent, they said, to review the arrangements made by the responsible executive bodies, even when naval oil was being dealt with. The committee had no claim at all to give rulings on the allocation of oil for Army needs which, if they were to come under this machinery at all, would clearly be the concern of the Munitions Assignments Committee (Ground). As for civil oil requirements these could not properly be brought within the compass of a purely Service body such as the Combined Munitions Assignments Board. The British went on to point out that to assign oil products by theatre before shipping was arranged was practicable only for 100-octane spirit, which could always claim shipping priority. Loading of other oil products was geared to shipping opportunities, and these reflected

the supply of tanker space, which could not be forecast on a month-by-month basis in time of shortage. Finally, for good measure, the British delegation attacked the way the Americans had gone about things—the shortness of the notice, the absence of discussion in the committee, and the presentation of the ‘assignments’ on a ‘take it or leave it’ basis. This was ‘a travesty of combined working’ forthrightly declared the Admiral leading the outnumbered British team on the Combined Munitions Assignments Board.

The British did not confine their resistance to argument. They brought pressure of their own to bear. They hinted that prior assignment of dollar oil in Washington would naturally have to be accompanied by prior assignment of sterling oil in London: the target aimed at here was the United States Navy which was now receiving fuel oil supplies from the Persian Gulf. The British lobbied their friends in Washington for support. Indeed, the new procedure stirred up bitter controversy among the Americans. The Army-Navy Petroleum Board itself opposed it and enlisted the support of Admiral King, the United States Naval Chief of Staff. ‘I think that fundamentally we have the trouble licked’, reported Mr. Wilkinson from Washington on 8th February. In the event the Munitions Assignments Committee (Navy) assignments in February and March 1945 were on a basis which the British, while strongly maintaining their opposition to the whole procedure, were able to accept; and those assignments seem to have been the last that were made by this procedure.

The outcome of the assignments controversy was a tribute to the skill and firmness of the British negotiators. But it came after a new British concession on stock target levels—which was what the whole disputation had been about. Early in January 1945 London came to the conclusion that, whatever the merits of the rival theoretical positions, United Kingdom stock targets must come down in any case. Oil stocks were in the middle of their normal mid-winter slide and the two American agencies, the Army-Navy Petroleum Board and the War Shipping Administration, were finding it hard to react as effectively as usual owing to the disagreement with their own Chiefs of Staff organisation. In any event it had become increasingly difficult to maintain that United Kingdom imports should be based on reaching a stock level of 7.3 million tons during winter months, when other theatres were reported to be even more hard pressed. At the end of November 1944 London had yielded a point by agreeing that theatre stocks of aviation spirit should include stocks held in airfield tankage, hitherto recorded as ‘consumption’.<sup>1</sup> In December the oil authorities in Britain made a thorough re-appraisal of United King-

dom stock needs, the first since the spring of 1943. They concluded from this they could get by with stocks of only 6 million tons at the end of March 1945. In so informing the American Chiefs of Staff however, the British Chiefs of Staff warned that 6 million tons would leave no cover for emergencies and urged that the level should be raised to 6.5 million as quickly as possible.

For their part the Americans were also now better disposed to yield a point or two. Provided that their basic contention—that stocks would be related directly to forecast consumption—was accepted, they were now ready to heed the British argument that special conditions called for special treatment: to agree, for instance, that the isolation of much naval storage in Britain and aviation spirit storage in the Middle East would necessitate transport-wasting transfers between storage points unless these areas were allowed a larger working stock than the American formula provided. The advent of the conference at Yalta also helped to smooth the way to agreement. For one thing it gave another chance to by-pass the less sympathetic personalities on the American side. For another it gave a psychological impetus to settlement since the Service Chiefs on both sides were anxious to use this period of personal contact to put an end to a dispute that had dragged on at long range for such a length of time. They appointed an *ad hoc* committee to work out a compromise. Its recommendations were accepted at a full meeting of the Combined Chiefs of Staff at Yalta on 8th February 1945.

The Yalta stock agreement was nothing like so favourable to the British as the one concluded with the Carter-Peckham Mission the previous September. After a struggle the British had to abandon the concept of the fixed minimum and to accept the principle upheld by the Americans that stocks in general<sup>1</sup> should always be related to consumption. In return the Americans agreed that both the ‘emergency reserve’ and the ‘working stock’ to be held in Britain and the *Overlord* area should be fixed at levels which took account of the complexity of the theatre distribution system.<sup>2</sup> On the face of it this was an important concession by the Americans. It meant that, on the basis of current forecasts of consumption, the United Kingdom target stock would be 1.8 million tons higher than under the original American proposal. The British also obtained American endorsement for the raising of the aviation spirit stock target in the Middle East theatre. Finally the Americans were persuaded to agree to a form of

<sup>1</sup> Tar oil, crude and ‘process’ oils, aviation spirit components and bitumen were excluded from this.

<sup>2</sup> The emergency reserve level was based on the number of days it would take to make emergency replacements, counting in ‘loading time’, ‘voyage time’, ‘unloading time’ and ‘theatre distribution time’. This last provided for the products ‘necessarily absorbed and immobilised in the internal theatre distribution system’ and took account of the differences between theatres in this respect.

<sup>1</sup> This nominally added 120,000 tons to the total of United Kingdom oil stocks.

words which left the British free to give effect to their principle of building up theatre stocks while the going was good. It was agreed that theatre target levels should not be exceeded as long as stocks in any other theatre were below target. But when surplus supplies did exist they were to be stored 'under the control of the owner or as otherwise agreed, in available tankage nearest to the source of supply, or where it appears most desirable strategically'.

The British negotiators came back from Yalta well pleased with themselves. Their leader, Lord Leathers, told the War Cabinet on 16th February that the outcome had been 'extremely satisfactory'. He said: 'our best hope had been 6 million tons while in certain circumstances we would have been ready to accept 5.5 million under protest'. In fact Lord Leathers was rejoicing too soon. The Americans interpreted this Agreement in a very different way, as will be shown in Chapter XX.

## (iii)

## One 'Slate' or Two?

Still another novel proposal was put forward by the Americans in the summer of 1944 and this proposal had an immediate practical relevance to the handling of oil supplies for Allied forces fighting on the Continent.

Two days after *Overlord* was launched the United States Chiefs of Staff, in a paper to the Combined Chiefs of Staff, suggested that responsibility for supplying the Continent should pass from London to Washington as soon as a firm lodgment had been achieved. As a precedent the Americans cited the way in which supplies to *Torch* had become an American supply responsibility once the assault phase of the operations had been passed.

This proposal by the American Service Chiefs rested on premises that were clearly false. For one thing, it assumed that the Allied forces on the Continent could avoid dependence on oil supplies from Britain and import all they needed direct from across the Atlantic. Such independence could not have been physically possible without a major use of the French Atlantic ports. However, the supply plans drawn up before the invasion never assumed that these ports would be available and, as it turned out, it proved impossible to use them.

Even had the Allies found it possible to by-pass Britain—and directly supply the oil needs of their Forces on the Continent—they

might well have concluded that it would be inefficient to do so. With one programme embracing both Britain and the Continent the Allies could arrange shipments to ports on either side of the Channel by selecting suitable tankers from a common stream of traffic. If tankers were arriving in distinct and separately directed streams there could be no such flexibility. Finally, as the British were quick to point out, the analogy with *Torch* was baseless. The analogy could have been valid only if North Africa and Southern Europe had been supplied on separate programmes executed by Washington and London respectively—a manifest absurdity that had never been contemplated.

To sum up, the case for supplying Britain and the war zones on the Continent through a common oil supply programme was overwhelming. But if there was to be only one programme, it followed that control of it would have to be in London. The authors of the American proposal found this line of reasoning hard to controvert. Indeed as the Americans soon made clear, their real reason for wanting to get the provisioning of the Continent out of British hands did not rest on the claims of either logic or efficiency. The motives which inspired the American Chiefs of Staff in this instance were the same that had inspired them earlier to challenge United Kingdom stock policy. Throughout their reply to the British Chiefs of Staff ran the suggestion that the co-ordination in London of Continental oil requirements with those of the United Kingdom might result in a 'misplacing of emphasis' in favour of United Kingdom needs. There was also an implication that to supply the Continent through the complex United Kingdom distribution system would be wasteful and inefficient.

The British now came to the conclusion that they were dealing with a simple misunderstanding. What they had to do was to explain to the Americans that, in standing out for unified programming, the British were not at the same time insisting that *all* supplies of oil for the Continent should physically pass through Britain. However, the British at the same time concluded that it would not be easy to put this point across through a long range exchange of position papers with the mistrustful United States Chiefs of Staff organisation. The British therefore suggested that the question of Continental supply should be handed over to experts who could thrash out the problems in face-to-face discussion. The Americans accepted this suggestion. On 28th July 1944 (as it happened, the day after the Allied forces had put the firmness of their 'lodgment' on the Continent beyond all possible doubt by breaking out of their bridgehead in Normandy) the Combined Chiefs of Staff agreed that the question of future oil supplies should be discussed during the forthcoming visit to London by Rear Admiral Carter and Brigadier-General Peckham.

These discussions resulted in a draft agreement which was ratified by the Combined Chiefs of Staff in October 1944. In principle the Americans won their point. The British conceded that responsibility for oil supplies to the Continent should be transferred to Washington. But an important qualification was attached to this concession. It was agreed that the transfer to Washington should not take place until the Supreme Commander, Allied Expeditionary Force, *after agreement with the supply agencies concerned*, had declared that port facilities on the Continent were sufficient to warrant the treatment of the Continent as a supply area distinct from Britain. This provision virtually made the agreement a dead letter—as its negotiators may well have intended. Port facilities on the Continent were never large enough to handle more than a small proportion of oil requirements there. Until the end of the fighting in Europe the demands of the Allied forces on the Continent continued to be met overwhelmingly from stocks in the United Kingdom.

## CHAPTER XX

## OVERLORD

(i)

## New Demands

IN the final year of the war against Germany the British authorities were confronted with an escalation in demands for petroleum far greater than in any of the earlier war years. The accompanying table presents details.

TABLE 41  
Consumption of Petroleum in the United Kingdom and S.H.A.E.F.<sup>1</sup> area  
1944-45 (weekly average)

	Total consumption	Armed Forces consumption			Civil consumption		
		All* products	Admiralty oil fuel	Aviation spirit†	Motor fuel‡	Bunkers§	Motor fuel‡
June 1943- May 1944	306·6	60·4	60·3	23·7	29·8	50·8	81·6
June 1944- May 1945	480·5¶	85·1¶	112·5¶	101·8¶	37·3	54·4	89·4¶

000 tons

\* Including refinery fuel and bitumen and therefore not comparable with Table 3.  
† Including small quantities used by engine manufacturers.  
‡ Petrol and derv fuel.  
§ Ocean-going vessels only. The figures are therefore not comparable with bunker figures in Table 3.

|| Including consumption of other products by the Armed Forces.

¶ Including following issues to S.H.A.E.F. area:

Total	106·9
Admiralty oil fuel	3·8
Aviation spirit	17·1
Motor fuel	80·4
Other	5·6

Oil consumption by the Armed Forces alone in the twelve months from June 1944 was greater than civil and Service consumption

<sup>1</sup> Supreme Headquarters, Allied Expeditionary Force.

combined during the previous twelve months. The biggest increase was in motor fuel consumption. The amount of petrol required by the Services went up fourfold; and their consumption of derv fuel used by tanks and other heavy military vehicles increased tenfold to approximately 10,000 tons a week. Yet, despite this scale of operations on the ground, aviation spirit remained the largest single item of Service demand. The fourfold increase of the previous year was nearly doubled during 1944-45. Meanwhile, offtake of naval bunkers also shot up by a third to reach a war-time peak of 4.4 million tons.

The bulk of this increased oil consumption by the Services—especially the increase in motor fuel consumption—of course took place not in Britain but among the Forces fighting on the Continent. Between August 1944 and the end of February 1945 (when military consumption in Southern France was incorporated into the S.H.A.E.F. 'slate') Service consumption on the other side of the Channel averaged 89,000 tons a week.

A notable point emerging from Table 41 is that civil consumption, for the first time during the war, also showed an increase compared with the previous year. Analysing the increase in civil demands by items the greatest rise was, not surprisingly, in bunker offtake from United Kingdom ports, reflecting the shipping effort required to support military operations in Europe. Less predictably there was also an increase of nearly 3,000 tons a week in motor fuel consumption by civilians in Britain. This was due to more intensive utilisation of motor vehicles for goods haulage, in farming, and for industrial uses. At this time there was also some relaxation in the provision of bus services. Private motoring remained strictly curtailed and the basic ration was not restored until the beginning of June 1945—when the war in Europe was over.<sup>1</sup> Demand for domestic paraffin also went up (though much less than demand for petrol) in 1944-45 because of a new influx into country areas of city-dwellers seeking escape from flying bomb and rocket attacks. Consumption of paraffin in farm tractors rose, but less than in previous years since there was a reduction in the area under cultivation. Finally, the use of oil for gas manufacture continued its upward trend. It will be remembered that because of the coal shortage gas undertakings were now receiving money from the Government to make gas from gas oil instead of coal. In the twelve months from June 1944 the gas industry's consumption was 1,000 tons a week higher than in 1943-44, when it had been 3,500 tons a week. This increase was more than balanced however by a further decline in the use of fuel oil in industry.

<sup>1</sup> It was restored at the same level that it had been at when it was abolished; increased supplementary allowances were also granted. After the Japanese war had ended the private 'basic' was restored to the 1941 level. Petrol rationing continued until May 1950 because of the post-war need to restrict dollar expenditure.

(ii)

## Shipment

The upsurge in consumption during 1944-45, and the associated demand to cover stock requirements, was accompanied by a decline in supplies from Britain's home sources. Billingham's output of aviation fuel went up in response to air force demands, but deliveries of fuel oil, mainly creosote-pitch, fell by a further 200 tons a week. Receipts of surplus bunkers also stayed well below the figure attained in 1943-44. Allowing for these factors, and for losses etc., more than 460,000 tons of oil a week would have needed to be shipped by tanker to Britain and the Continent to meet programmed requirements for consumption and stockbuilding<sup>1</sup> in the final year of the war in Europe; this represented an increase of nearly 50 per cent. on the 1943-44 figure. In fact, as Table 42 shows, tankerborne supplies could not match this requirement. Average weekly imports by tanker into Britain and the S.H.A.E.F. area between June 1944 and May 1945 amounted to only about 390,000 tons; even in the seasonally most favourable periods they remained under 440,000 tons a week.

TABLE 42

United Kingdom and S.H.A.E.F. Oil Imports 1944-45\* (weekly average)

000 tons

	United Kingdom		S.H.A.E.F.	Sources of tanker shipments	
	Tanker shipments†	Surplus bunkers	Direct shipments	Eastern seaboard	Caribbean/Gulf
June 1943-May 1944	314.4	19.5	—	251.0	60.7
June-August 1944	436.6	21.6	—	372.9	81.1
September-November 1944	370.4	10.4	14.5	301.5	91.3
December-February 1945	282.4	8.1	18.7	255.6	52.4
March-May 1945	389.4	7.8	43.9	348.3	93.1

\* Based on calendar months and therefore not quite comparable to the consumption figures given in Table 41.

† Including packed imports and small supplies from miscellaneous sources not included in the following columns.

As in 1943-44, the reason for the shortfall was competition from other main importing areas for tankers. In this respect the course of

<sup>1</sup> This figure allows for the British decision to reduce the United Kingdom stock target after *Overlord* was launched.

events in 1944 resembled closely events during 1943. A comfortably high stock level in the summer made it difficult for the British authorities to resist requests from other war theatres for tankers during late summer and early autumn. Withdrawal of these tankers from British supply led to a sharp fall in stocks during the closing weeks of the year, followed by a winter shortage and an import recovery in the spring—which again, as in 1944, was outstripped by increases in consumption. Despite the best efforts of Mr. Wilkinson in Washington, the United Kingdom's oil stocks fell to what London insisted were dangerously low levels. By the beginning of May 1945 stocks were considerably lower than in the spring of 1941—hitherto the low point of the war.

In 1944 diversion of tanker tonnage from the United Kingdom supply fleet started earlier than in 1943, but accompanied a record level of imports during the summer of 1944. Diversions began with some withdrawals from the CU system to assist the West Mediterranean theatre. In November 1943 the OT 'Greyhound' convoys which supplied that theatre with oil from the Caribbean had been changed from a monthly to a two-monthly cycle in order to release 'Greyhounds' for the CU system. Now, in the summer of 1944, to accommodate the demands of *Anvil* (the landing in Southern France) this process was reversed and 'Greyhounds' were shifted into the OT convoy system. To keep up United Kingdom imports with fewer tankers, the CU convoy cycle was shortened from nine days to eight.

However it was the demands of the Pacific war and of American coastwise traffic which did most to deplete United Kingdom oil stocks in the second half of 1944. On the 20th July the British offered fourteen HX class tankers to assist United States coastwise shipments; they agreed to release two more on 5th August in response to an American inquiry. On 18th August the British offered the Americans the services of another fifteen black oil tankers until the end of the year. At the end of that month it was decided to send five tankers to the Indian Ocean. At that time oil stocks in the United Kingdom were well above target and still climbing. However in the course of September urgent requests for tanker reinforcements began to come again from the Pacific, where preparations were afoot for reconquest of the Philippines. This operation promised heavy calls on tonnage, as the British soon discovered. Specifically the Americans in the Pacific requested, in mid-September, that twenty-five tankers should be sent to them every month down to the end of the year—over and above those they were already due to receive. Late in October, with the invasion of the Philippines underway, the Americans asked for another ten tankers.

The only source for these tankers seemed to be the CU 'Greyhound'

squadrons sailing to Britain. By September 1944 the strength of the CU system had reached over a hundred vessels. At the end of that month, the British agreed that the average number of tankers per squadron be reduced from twenty to seventeen during October and November. But this was not enough. For in November the Pacific theatre put in another request for yet a further twenty-two tankers. Under the pressure generated by this demand the British agreed late in October to forego all November deliveries for stock-building. Towards the end of November they also agreed to make no claim for the services of any new 'Greyhounds' launched during December on the United States Atlantic coast.

As a result of these withdrawals the average strength of the tanker fleet actively engaged in supplying the United Kingdom and S.H.A.E.F. area fell by almost a million deadweight tons during the last five months of 1944. The British had no option but to accept the decline. They could hardly argue that Pacific operations should be endangered to prevent stocks in Britain from falling at a time when they were still well above the level they were on the point of adopting as their new target level. But British acceptance was hedged with reservations. They agreed on the understanding that the CU convoy system would be reinforced by all the tankers launched on the United States east coast during the first three months of 1945. Even that would not prevent stocks from falling below their revised target by the end of March; though not below the level they were prepared to accept.

In the event the British soon found that this assumption of theirs had been little more than wishful thinking. So far from being built up again the tanker fleet supplying the United Kingdom and S.H.A.E.F. was further depleted in the early weeks of 1945. The culprit on this occasion was not the Pacific but United States coastwise traffic. The winter of 1944-45 was the most severe for forty years in the eastern United States and weather conditions sharply cut down the amount of oil that could be moved overland. Many marshalling yards and junctions were almost put out of action; tank cars were immobilised and for a three-day period in January there was an embargo on the movement of non-military supplies of oil by rail. Coming on top of the seasonal halt to movements along frozen inland waterways and through the Great Lakes, the effects of the severe weather on rail and road transport made extra coastwise deliveries of oil by tanker unavoidable. All the main war theatres, even the Pacific, were dunned to release 'Greyhounds' to carry oil to the north-east United States. Shipments to the Mediterranean were held back and more vessels were withdrawn from the CU tanker squadrons. During January and February 1945 the average strength of those squadrons fell to under fourteen tankers.

Long before this, however, London had taken alarm at the way



things were going. On 2nd February a report from Mr. Geoffrey Lloyd induced the British Chiefs of Staff Committee to send an anxious cable to the Prime Minister and Minister of War Transport at Yalta. This was followed by the Yalta stock agreement which, on British understanding should have pegged oil stocks in this country roughly to their level at the end of 1944. Meanwhile, to restore the situation, London arranged for increased deliveries to be made to the West Mediterranean from the Middle East refineries. This enabled medium speed tankers which had been supplying the West Mediterranean theatre from the United States to be switched over to supplying the United Kingdom—ultimately, at the expense of stocks east of Suez. A number of small tankers being fitted out for service in the Far East were restored to cross-Channel ferry work; this released larger tankers for ocean service.

But much more than this was required. By late February 1945 the British authorities had come to the conclusion that the tanker fleet supplying Britain could, and should, be reinforced from the Pacific where the British were convinced that tonnage was being wasted. 'We have made it clear', cabled Mr. Wilkinson, 'that in our opinion the Pacific can well afford temporarily to disgorge . . . thirty ships or so notwithstanding their statistical position in which we have no faith'. The British estimated that an extra forty 'Greyhounds' were needed if United Kingdom stocks were to be prevented from falling by the end of April below a level that would entail a risk that operations against Germany might have to be curtailed for distributional reasons.

But the American Chiefs of Staff were unimpressed. The stock level quoted, they said, would represent sixty days forward consumption for the United Kingdom at a time when the Mediterranean would have only thirty-seven days and the Pacific, as a whole, only twenty-four days supply. What really exercised the Americans was that the invasion of Okinawa had been planned for the beginning of April and nothing short of a strategic directive by the Combined Chiefs of Staff could have extracted 'Greyhounds' from the Pacific at such a time. Grounds for such a directive might have been sought in the Yalta stock agreement to hold United Kingdom stocks to 6.45 million tons. But, on closer consideration, this turned out to be by no means as favourable to Britain as at first reported. For it contained a clause which nullified all the British had thought they had gained. This said that 'priority . . . shall be accorded to the maintenance of the emergency reserve levels in all theatres with the balance of all theatre levels to be accumulated as rapidly as practicable thereafter, each theatre taking its proportionate share of any shortage in supplies and tankers'. In other words the Agreement could not be invoked to prevent a United Kingdom stock fall, until

United Kingdom stocks had dropped below 4 million tons, the 'emergency reserve level' fixed for this country.

Failing to move the American Chiefs of Staff the British tried again at lower level. On 1st March 1945 a party of British officials arrived in Washington to draw up the third United Nations Oil and Tanker Programme.<sup>1</sup> They lobbied energetically for more tankers for Britain, and found the Army-Navy Petroleum Board and the Petroleum Administration for War as co-operative as ever in looking for ways to release them from other trades. During numerous meetings in early March the two sides carried out a systematic review of the world tanker position—with useful results for the British. For one thing the Pacific theatre was persuaded to abandon a claim it had put forward for yet another sixty-one 'Greyhounds'. It was also decided that the Mediterranean theatre could release a number of tankers during March and April. The Petroleum Administration for War undertook to hasten the normal seasonal release of tonnage from the eastern seaboard trade; and the Army-Navy Petroleum Board declared its 'firm intent' to send tankers arriving in the Caribbean to load for the Pacific, on intermediate trips to New York. This, the visiting British party reported, was the best that could be done for United Kingdom stocks short of a high level decision to curtail supplies to other theatres.

It proved to be by no means a bad best. The Petroleum Administration for War was able to release vessels from eastern seaboard service even earlier than they had expected. Between the middle of February and the end of April 1945 the average number of tankers per HX convoy was 9½ compared with only 7½ between October 1944 and February 1945.<sup>2</sup> The average size of the CU convoys rose again to twenty from the middle of March.<sup>3</sup> Between March and May 1945 oil imports into Britain were nearly as high as in the record summer of 1944.

Even so, United Kingdom stocks went on falling. Consumption rose even more as the Allied offensive on the Continent reached a climax. London had foreseen this would happen: it had been the discrepancy between visible supplies and their estimates of what would be needed in the spring that had given them most anxiety in February. But in the event their worst fears were exceeded. By early April 1945 consumption was ahead of their most generous estimates; and the forward United Kingdom stock picture looked even bleaker than a month earlier.

At this juncture, to make matters worse, new and unprecedentedly

<sup>1</sup> See p. 420.

<sup>2</sup> From HX.339, sailed 18th February 1945, to HX.354, sailed 3rd May 1945, and from HX.312, sailed 5th October 1944, to HX.330, sailed 12th February 1945.

<sup>3</sup> From CU.62, sailed 15th March 1945.

large demands for tankers came forward from the Pacific. Authorities in the Pacific pointed out that their tankers were now taking longer than had been allowed for in their earlier calculations because supply lines had lengthened again. The Army-Navy Petroleum Board could not ignore this situation entirely. At the end of March, 'with the most extreme reluctance' they put a set of proposals to the British which directly or indirectly, would have deprived the United Kingdom of the equivalent of twenty-four 'Greyhound' cargoes due to be delivered by the end of June.

This new demand came as a last straw to London; it was estimated that the loss of these cargoes would cause United Kingdom and S.H.A.E.F. oil stocks to fall below distribution breakdown point in June. On 12th April the Executive Committee of the Oil Control Board held a special meeting to consider the situation. The Admiralty agreed to allow the diversion to the Pacific of four tankers due to load fuel oil for Britain in April. Beyond this London refused to go. If necessary, the Executive Committee agreed, the Combined Chiefs of Staff would have to be asked for a ruling on theatre priority. Throughout April the British refused to budge from this position.

At the beginning of May the Americans in the Pacific made a new effort to get the tankers released. They countered British claims by asserting that they too would have to curtail their operations unless they got the extra tonnage they needed. The tug-of-war between S.H.A.E.F. and the Pacific was now at crisis point. Fortunately it never had to be carried to a finish. One week later the Germans surrendered and the European fighting came to an end. The very next day London agreed to release eighteen 'Greyhounds' from the CU system within three weeks, and to further reductions in 'Greyhound' loadings during June. At the end of May convoys were abolished in the West, and tanker carrying capacity was greatly increased. There was no longer any need to deny the Pacific theatre whatever tonnage it asked for.

## (iii)

## Reception

From the account just given it will be evident that ports in the United Kingdom had to bear a much greater burden of oil traffic during 1944-45 than ever before. Oil cargoes discharged at commercial ports amounted to some 320,000 tons a week between June

1944 and May 1945 compared with 263,000 tons a week during 1943-44. The table below shows how this traffic was distributed by comparison with earlier periods:

TABLE 43  
United Kingdom weekly average Oil Imports\* by Groups of Ports 1942-45

	Total	West Coast	Thames	Other East Coast	South Coast
1938	213.4	81.5	69.9	35.6	26.4
January 1942-May 1943	160.5	151.2	4.5	3.1	1.7
June 1943-May 1944	262.8	239.5	11.9	6.9	4.5
June 1944-May 1945	320.5	243.6	58.7	6.9	11.3

\* Excluding Admiralty oil fuel.

The table shows that roughly four-fifths of the additional supplies received in 1944-45 were imported through the Thames Estuary, and that there was also some increase at south coast ports. Imports through the west coast amounted to only 75 per cent. of total imports into commercial ports compared with over 90 per cent. the year before. Seventy-five per cent., it may be remembered, was the proportion originally allotted to the west coast in the pre-war plans for 'diversion'.

The revival of imports through south-east and south coast ports began in July 1944 when the ban on direct oil shipments to the Thames, partly lifted in the autumn of 1943, was relaxed still further. After 'prolonged and rather difficult argument' the Americans agreed, in the middle of that month, to allow 'Greyhounds' to sail unescorted round Scotland and pick up convoy at Flamborough Head.<sup>1</sup> In September the Channel was reopened to ocean shipping; this meant that 'Greyhounds' took little, if any longer, to reach the Thames Estuary than to reach west coast ports. It therefore became convenient to feed London once more through its traditional supply points. By February 1945 the riverside oil wharves were receiving supplies from down river, instead of from Walton-on-Thames. Between January and May 1945 the average weekly rate of imports through the Thames Estuary exceeded 75,000 tons. This was substantially more than before the war, when the Estuary had been the greatest oil reception area in Britain.

<sup>1</sup> The Americans accepted this because of the shortage of HX and SC class vessels, which were required for cross-Channel movements.

Meanwhile the west coast ports had also been improving on their previous year's performance; between June and September 1944 they were called upon to handle a new war peak load of over 300,000 tons of oil a week. They were able to do so because of a further advance in tanker handling efficiency. During the last three months of 1944 tankers discharging on the west coast spent an average of only four days in port, as compared with five days twelve months earlier—and almost seven days in the same period of 1941. If the time spent waiting to sail or repair (which is affected by factors such as weather or convoy arrangements that have nothing to do with port operations) is excluded, the improvement appears even more striking—a turn-round time of 2.7 days in 1944 compared with just over four days in 1943 and 6½ days in 1941. By the spring of 1945 the average rate of cargo discharge had risen to 483 tons an hour as compared with 260 tons an hour in the spring of 1942. The average cargo unloaded from each tanker in 1944 was 13,500 tons as against 11,700 tons in 1941. The improvement in these last two factors reflected the increasing number of 'Greyhounds' discharging at British west coast ports.

This change in the pattern of oil imports after the middle of 1944 meant a change in the pattern of oil distribution within the country. The major development was in movements from the east coast. Between the spring of 1944 and the end of June 1945 over a million tons of aviation spirit went by pipeline from the north bank of the Thames Estuary to the 'bomber area' of eastern England. From the Isle of Grain on the south side of the Estuary nearly 400,000 tons of petrol that had been shipped direct to the Thames<sup>1</sup> was pumped to the terminus of the cross-Channel pipeline at Dungeness.<sup>2</sup> The change to feeding London from the Thames Estuary has already been mentioned. There was also some revival of oil barge traffic from the installations at the mouth of the Humber over the Humber and Trent Navigation systems into the West Riding.<sup>3</sup>

But even after the middle of 1944 the main body of oil movements within Britain continued to originate from the west coast ports. Table 44 opposite shows how much the pipeline network contributed to these movements. The table shows that the amount of oil distributed by pipeline from the west coast reached its peak in the second half of 1944, and fell away sharply in 1945 when imports were partly diverted back to the east coast. It also brings out how little use was made of the 'strategic' line between Avonmouth and Stanlow.

<sup>1</sup> In addition to supplies pumped via the Isle of Grain from Avonmouth.

<sup>2</sup> See Map facing p. 213.

<sup>3</sup> These movements from the east coast were drawings on stocks, since there was no revival of shipments direct to the Humber. East coast installations were full of oil during the summer of 1944, mostly as a result of earlier overland supplies from the west.

TABLE 44  
Oil Movements from the West Coast by Pipeline 1942-45

000 tons

	White Oils				Black Oils	
	Total White Oils	Avonmouth to Aldermaston, Thames	Avonmouth to South Coast, including movements via Isle of Grain	Avonmouth to Stanlow through North-South line	Avonmouth and Stanlow into Midland circuit	Clyde to Forth movements for Petroleum Board*
1942-43	2,080	1,209†	339‡	154§	378	684
January-June 1944	1,527	432	280	85	730	617
July-December 1944	1,619	263	477	61	818	148
January-June 1945	1,296	209	298	49	740	20

\* From January 1942.  
† From November 1941.  
‡ From August 1942.  
§ From September 1942.  
|| From May 1943.

Yet even in the period of their greatest use pipelines took second place to the railways in the movement of oil across country from the west. For purposes of comparison it will be more useful to take the calendar year 1944 when the volume of total traffic (and of pipeline movements) was certainly greater than in the period June 1944 to May 1945. In 1944 about 12 million tons of oil was moved inland from the west coast installations. Of this the pipelines accounted for 3.8 million or less than a third, and the railways for 6 million tons, of which roughly half was aviation spirit. This last figure may be compared with about 4½ million tons carried from the west coast by rail over 1943 and about 3 million tons carried in 1938.

This improvement in railborne deliveries was made possible by the steady increase in the size of the rail tank car fleet. At the end of 1940 Shell-Mex House had under 7,000 cars working for it; by the end of 1943 it had about 9,000. In the following six months a further 600 were added. In addition during the summer and autumn of 1944 they had the use of 500 American tank cars shipped across for transfer to the Continent and loaned to carry petrol in Britain pending the delivery of 500 new British tank cars ordered by the Air Ministry earlier in the year.

In part the improvement in railborne movements also reflected the high level of efficiency in tank car handling reached by the railways in the final months of the war. During 1944 each tank car carried an average of 50 tons of oil a month compared with only 36 tons in 1938; and this despite the fact that journeys under war-time 'diversion' conditions were between two and three times greater than in peace-time. In the summer months of 1944 the tank car fleet

as a whole achieved a carrying capacity of 57 tons per car per month, and cars carrying petrol and aviation spirit carried 80 tons a month, involving between six and seven round journeys from each car. The rise in performance was due, of course, to the war-time innovation of special oil trains which came to carry over four-fifths of the traffic. 15,000 oil trains were despatched during 1944; in the peak summer months between fifty-five and sixty-five trains a day were sent off, mostly from the four main west coast ports.<sup>1</sup> The railways were able to fit all this extra oil traffic in with their other growing traffic commitments in support of *Overlord* by a notable feat of administration.

Between them rail and pipeline movements accounted for over 80 per cent. of 'first stage' movements (that is liftings from ocean installations) from the west coast during 1944. Coastwise movements also played a part until direct shipments to the east coast were more freely permitted; in mid-July 1944 there were no less than nine ocean-going tankers shuttling oil from the west coast round to Thames Haven. As for road transport, this played its major role in 'second stage' movements (those between distribution depots and consumption points). In the later stages of the war the rapidly growing offtake of aviation spirit laid a huge and growing burden on the road tankers carrying supplies from distribution depots to airfields on behalf of both the Royal Air Force and the United States Army Air Force. In 1944 road tankers ran a total of 103 million miles as compared with only 65 million in 1940.<sup>2</sup>

This extra transport burden was carried without any substantial increase in the number of road tankers. Owing to the production situation Shell-Mex House was able to do little more than replace those that had worn out. In May 1944 its fleet of 5,400 serviceable vehicles was only 500 stronger than at the start of the war and this increase—small as it was—was obtained only by keeping the lorries longer in service than in peace-time. The improvement in carrying capacity in the later months of the war was achieved by more intensive working, made possible by the recruitment of extra drivers and by imposing longer working hours on each driver. The number of drivers rose from 5,220 in January 1943 to 6,250 in the summer of 1944. Their working week, which had been fifty-two hours during the slack period before mid-1943, rose first to sixty and then to sixty-four hours.

<sup>1</sup> A fuller account of oil transport in war-time is contained in a history of the Petroleum Board published in the *Petroleum Times* in 1945.

<sup>2</sup> *Ibid.*

(iv)

*Pluto*

The movement of oil within Britain was only part of the transport task during this final year of the war. There was also the need to send supplies from this country into the forward areas across the Channel.

As in North Africa the first waves of Allied troops to arrive in Normandy relied on 'packed' supplies, carried this time in 4-gallon containers in the dual-purpose 'Chant' tankers. But the plans for supplying them in bulk through the *Tombola* 'ship-to-shore' arrangements and through *Bambi* were put in hand right away. Concrete storage barges, each of roughly 180 tons capacity, were towed across the Channel to provide initial bulk storage in harbours, estuaries and inland waterways. Nineteen days after D-day the first *Tombola* pipeline to permit discharge from ocean-going tankers moored off the open beach, was laid at Port-en-Bessin, the small port chosen for the initial reception of oil in bulk. Ultimately two *Tombola* lines were laid there for use by the British; five were laid for the Americans at St. Honorine des Pertes, a few miles to the west. Discharge began on 3rd July. But *Tombola* met with limited success, since the pipelines tended to break.

Meanwhile Port-en-Bessin was also being supplied by 'Chants' and other small tankers of up to 1,350 tons. This supply method also ran into difficulties. The little vessels took a heavy pounding from the sea and many of the pre-fabricated 'Chants' were quickly put out of action. By 28th July there were sixteen of them repairing, or awaiting repair, at Hamble where a special tanker repair organisation had been set up.<sup>1</sup>

The disadvantages of supply through Port-en-Bessin made the capture of other ports of considerable importance. A step forward came in August when Cherbourg was opened for ocean tankers. Direct deliveries there from across the Atlantic began in September. But Cherbourg was not a big oil port and possessed little white oil storage. At first it could handle only one tanker at a time, and Port-en-Bessin still had to be used. During September, however, the whole continental coastline as far as Antwerp fell into Allied hands.<sup>2</sup> Antwerp itself was a big port capable, like Cherbourg, of receiving

<sup>1</sup> In the two months after D-day this repaired some 150 vessels.

<sup>2</sup> Of the French Atlantic ports Brest, which was captured on 18th September, was completely wrecked. St. Nazaire and Lorient were held by German garrisons until the end of the war.

ocean tankers, but it could not be used until late November when the approaches to it had been cleared. Ostend, captured on 9th September, was a useful port for smaller vessels, though the sinking of blockships at the entrance to the harbour restricted the use that could be made of it. It was chosen as an advanced point for bulk petrol storage and the first tanker discharged there on 29th September. Calais and Boulogne were considered as reserve tanker ports, but in the event neither was used for this purpose. The most valuable acquisition was, therefore, Le Havre, captured on 12th September with its oil docks undestroyed. During October and November the Allies also used Morlaix, a small and unsatisfactory port to the west of Cherbourg. All these ports were supplied by small tankers from England, oil from Le Havre being ferried up the Seine to Rouen in American Army 'Y' tankers.

But what became of *Pluto*, the ambitious scheme for pumping oil under water direct from Britain to France? This scheme proved to be a sad disappointment. Between June and October 1944 only 3,300 tons of oil was transferred to the Continent by pipeline. One reason for this low figure was the time it took to get it started. It had been planned to lay the first pipeline from the Isle of Wight to Normandy, if necessary on to the open shore, eighteen days after D-day, and to complete the whole of this *Bambi* system by D+75 (20th August). In fact nothing was done at all until after Cherbourg had been taken on 1st July. Next, a whole month was taken up in deciding whether the French terminus of the line should be outside the breakwater, which could make discharge difficult, or inside it, which could endanger the harbour. Ultimately it was decided to put it outside the harbour altogether. Thus the first line—a 3-inch Hais cable—was not laid until 12th August; a second followed two days later. The first Hamel pipes were laid with the aid of the Conun drums between 25th and 28th August.

Not only were these attempts far behind schedule; they were none of them successful. All the lines were damaged either during the lay or in bringing the end on shore. This experience, which belied the evidence gained from the trial lays across the Bristol Channel and the Solent, seems to have been due to insufficient training of the naval laying party and, in the case of the Hamel pipes, to a defective drum and inadequate laying technique. Pumping through *Bambi* did not start until 18th September. By then, with Le Havre and Cherbourg in Allied hands, the effort seemed hardly worth continuing. On 4th October the *Bambi* operation was wound up and attention was concentrated on *Dumbo*, the shorter pipeline system from Dungeness to Boulogne.

Pipelaying for *Dumbo* began in October 1944 as soon as the approaches to Boulogne had been cleared of mines. Pumping started

on 27th October. But here also progress was much slower than expected. The rough autumn weather in the Channel brought many delays. The laying ships had to run for shelter at every gale warning, and many fine days were wasted because ships could not get into place again quickly enough to take advantage of them. There were frequent changes of plan and the enthusiasm of the *Pluto* force gradually dwindled. By the middle of December only six Hais cables (four 3-inch and two 2-inch) were in position, of which only four were actually working. Their performance was disappointing. It had been planned to pump oil through them at a pressure of 1,500 lbs. per sq. inch, but in fact, owing to the way they had been laid, pressure had to be kept down to 350–440 lbs. Daily deliveries across the Channel amounted to no more than 700 tons. During eighty-five days down to 20th January 1945 only 62,000 tons of oil, all of it petrol (for the original plan to pump aviation spirit as well was never implemented) was pumped through *Dumbo*.

Meanwhile, in December, the Navy had raised the question whether *Pluto* was worth going on with in view of the number of ships and men involved in it. By then Antwerp, although under heavy bombardment from flying bombs and rockets, was receiving one ocean tanker a day; and small tankers were carrying some 2,500–3,000 tons a day to Ostend, and comparable quantities to Le Havre. The matter was considered by the Joint Administrative Planning Staff. The strongest argument for continuing with *Pluto* was the need to save small tankers which were wanted for service in the Far East. Only Cherbourg and Antwerp could take ocean tankers and it was not possible to step up supplies through those ports; Cherbourg was working full out taking two 'Greyhound' cargoes from each CU convoy, and Antwerp was thought to be too vulnerable to risk sending additional ocean tankers there. Accordingly, on 2nd January 1945, the Principal Administrative Officers Committee ruled that *Dumbo* should continue. The intention was to use up all the Hais cable to achieve an estimated 3,300 tons a day through the system by 1st February (allowing for a reserve capacity of 50 per cent. which was thought essential) and assuming that more careful laying would allow the oil to be pumped under the planned pressure of 1,500 lbs. per sq. inch. No plans were made for using the Hamel pipe since it had not yet proved possible to lay this successfully even under summer conditions. Later in January, however, a new technique led to a successful Hamel lay. In the middle of February the Principal Administrative Officers Committee authorised the laying of five Hamel pipes in addition to the Hais lines in order to achieve the maximum saving of small tankers.

Thus *Dumbo* pipelines continued to be laid until the German surrender and even afterwards; a 3-inch Hais cable was actually laid

on 24th May 1945 as the quickest way of clearing the cable ship on which it was wound. *Dumbo* by then consisted of sixteen lines (eight 3-inch and two 2-inch Hais cables and six 3-inch Hamel pipes) of which eleven were usable giving a total throughput capacity of some 4,000 tons of petrol a day. The *Dumbo* system continued to be used down to the end of July 1945, the petrol being pumped from the War Office storage on the Isle of Grain. The line was then abandoned to save technical manpower, and the supplies it had carried went through Antwerp instead.

*Pluto* was much the most enterprising—and later the most widely publicised—arrangement for supplying oil to the Allied forces on the Continent. However the Chiefs of Staff never relied on it—and were wise not to do so. In retrospect it seems clear that *Pluto's* advocates had been far too sanguine. They had assumed that it would be possible for the naval laying units to achieve immediately the degree of technical proficiency attained by the technically expert laying parties in the trials conducted in 1943 under the supervision of those who had designed the equipment; and that what could be done in the Bristol Channel and the Solent could be done in war-time operational conditions on the much longer lay across the Channel.

In fact the early efforts to lay lines to Normandy had been a complete failure; and this failure of *Bambi* meant that *Pluto* contributed nothing to Allied supplies at the time when its help would have been of the greatest value—that is when no regular oil ports were available on the Continent and the Allies were relying on the unsatisfactory Port-en-Bessin. *Dumbo* was more successful; but at a time when success was of less importance. It made no substantial contribution until the campaign in Western Europe was already more than half over; and then its average rate of throughput was little more than a tenth of total supplies across the Channel.<sup>1</sup> It did not reach its peak performance (of roughly 3,300 tons a day) until after the fighting was over—and only did so after far more lines had been laid than was originally thought necessary. The fact was that the pipelines became unserviceable much more quickly than had been expected. Experience with the steel Hamel pipes was particularly bad, as they developed leaks through friction with the sea bed. This technical problem does not seem to have been anticipated. By the middle of July 1945 sea bed friction had put five Hamel pipelines out of action after an average life of only fifty-six days.

<sup>1</sup> Comparing shipments to 'Far Shore' over six weeks 29th March–10th May 1945 which averaged over 24,000 tons a day, with 2,500 tons a day through *Dumbo* between 20th January and 22nd May 1945. At the end of 1944 daily throughput through *Dumbo* was 1,250 tons.

Perhaps the most trenchant epitaph on *Pluto* is provided by a few figures of comparative achievement. Down to the ending of German resistance on 10th May 1945, almost 5·2 million tons of oil products were delivered to the S.H.A.E.F. area through the ports of North-West Europe. Of this about 826,000 tons came direct from across the Atlantic and 4·3 million tons, or 84 per cent. was delivered across the Channel from England. *Pluto's* contribution was only 370,000 tons, less than 8 per cent. of the cross-Channel supplies. This was equivalent to an average delivery rate of under 1,800 tons a day from the time when pumping began.

## CHAPTER XXI

### THE EAST

(i)

#### Eastern Markets

THE effects of growing oil consumption in the European and Pacific war theatres has been the main theme of the last three chapters. But oil demands also rose after the middle of 1943 in the third main area of war activity—the countries bordering the Indian Ocean. Here military requirements were increased by the offensive in South-East Asia. Between mid-1944 and mid-1945 oil consumption by the Armed Forces in India and Ceylon was almost twice its 1943 level. To set against this increase in the Indian theatre there was a fall in military demands elsewhere, especially in the Middle East, which ceased to be an active war theatre after the end of the North African fighting in May 1943. Nevertheless total Service consumption of naval oil fuel, aviation spirit and petrol throughout the countries bordering the Indian Ocean rose from about  $3\frac{3}{4}$  million tons in 1943 to nearly  $5\frac{3}{4}$  million during the last twelve months of the war.

Civil consumption also rose despite the efforts of governments to restrain it. In Australia, New Zealand and South Africa petrol was the largest item of civilian oil demands, and it remained fairly strictly rationed in all three countries until the end of the war. In South Africa—where allowances were far more generous than in Australia and New Zealand—a final cut of 25 per cent. in issues of supplementary petrol rations went into effect in September 1943. In India petrol rationing was supplemented by efforts to promote the use of gas motor fuel and it was estimated that about one-third of that country's commercial motor vehicles were running on producer gas by September 1944. Total civilian demand in India rose, in fact, because of rising paraffin and black oil consumption.

Demand for paraffin climbed not only in India, but in all the Eastern countries. In the three Southern Dominions, as in Britain, this was due to farmers' increased needs for tractor fuel. In Egypt

demand for paraffin burning oil reflected the increase in population, and therefore demand increased despite the existence of paraffin rationing. At the end of 1944 the British authorities in Cairo estimated that the rationing scheme was saving some 30,000 to 36,000 tons of paraffin a year. In Syria and Palestine consumption of paraffin was actively encouraged by the authorities because of the shortage of other kinds of fuel. In India the Government released additional supplies to the civilian market during the final year of the war as part of an effort to combat inflation by making more consumer goods available.

As for black oils, the biggest item of civil demand East of Suez was still for ships' bunkers. Here the trend of demand was downwards after the reopening of the Mediterranean in mid-1943. That event restored to Port Said, Suez and Aden some of their pre-war importance as fuelling points on what became once again a main shipping route. The rise in offtake at Middle East bunker ports was at the expense of bunkering at the ports of South and East Africa, no longer the main gateways to the area from the West; from 1.6 million tons in 1942 consumption in South and East African ports fell away to only a quarter of a million tons over 1944-45. In the final year of the war total bunker demand went up around the Indian Ocean owing to a sharp rise in bunker demands at Indian, Ceylonese and Australian ports, reflecting the build-up of the war effort against the Japanese.

The use of black oils on land, which had been increasing steadily in the East since 1941, went on rising over 1943-45. In the Middle East the process of conversion from solid fuels to oil continued. By the end of 1943 the conversion of the Egyptian railways from coal to oil-burning had been completed. In 1944 a start was made on converting the Sudanese railways. In India the position was different. The Indian government had been striving to do exactly the opposite from the Middle East governments, namely to convert all users to coal. In consequence Indian inland black oil consumption had been less in 1943 than in 1942. This policy was hampered, however by shortage of supplies of solid fuel. Instead of rising, Indian coal production fell. Moreover there were difficulties in transporting the coal all the way across country from the coalfields in the east to the new coal users on the west coast. As a result the oil-to-coal conversion policy in India had to be reversed in the later years of the war. In June 1944 London approved the shipment of an additional 15,000 tons a month of oil to India to meet essential west coast industrial needs. In August this allotment was doubled. Over the final twelve months of war inland consumption of black oils in India exceeded a million tons. This was twice as much as in 1941. The table opposite gives an idea of the comparative pattern of oil consumption in the Indian

Ocean area in 1943 and in 1944-45. The figures are only approximate and mainly reflect import returns.

The rising demand for oil in the East after the middle of 1943 made proportionately small demands on shipping. Table 38 showed that, after 1942, the volume of tanker tonnage plying to Indian Ocean countries changed very little. Between August 1944 and July 1945 it

TABLE 45  
Oil Consumption in the East 1943-45

millions of tons

	Total consumption	Armed Forces consumption			Civil consumption				
		All products	Aviation Spirit	Motor Spirit	Admiralty Oil Fuel	Motor Spirit	Paraffin	Black Oil	
								Inland	Bunker
1943									
Middle East	7.2	0.5	0.7	0.6	0.6	0.6	2.1	2.1	
India/Ceylon	2.8	0.2	0.4	0.3	0.2	0.4	0.7	0.6	
South and East Africa and Australia	4.5	0.2	0.4	0.5	1.1	0.4	0.6	1.3	
<b>Total</b>	<b>14.5</b>	<b>0.9</b>	<b>1.5</b>	<b>1.4</b>	<b>1.9</b>	<b>1.4</b>	<b>3.4</b>	<b>4.0</b>	
1944-45									
Middle East	7.2	0.3	0.4	0.6	0.4	0.7	2.5	2.3	
India/Ceylon	6.7	1.7	1.0	1.0	0.3	0.5	1.0	1.2	
South and East Africa and Australia	3.9	0.1	0.4	0.2	1.1	0.5	0.5	1.1	
<b>Total</b>	<b>17.8</b>	<b>2.1</b>	<b>1.8</b>	<b>1.8</b>	<b>1.8</b>	<b>1.7</b>	<b>4.0</b>	<b>4.6</b>	

averaged about 1.9 million deadweight tons (including vessels engaged in local trades), compared with about 1.8 million in the previous twelve months, and just over 1.7 million between August 1942 and July 1943. One factor reducing the burden on shipping was the change in the pattern of demand. As Table 45 indicates, the main increase in demand arose in places within easy reach of Middle Eastern oil sources, and there was an actual decline in requirements in countries further away. But the main reason why tanker requirements failed to rise was that local oil output was able to increase in step with local demand.

Table 46 shows output at the main exporting refineries and the local refineries in the East from 1942 onwards; output in 1939 is used as a measure for comparison. Of the factors contributing to increased production, the pumping of fuel oil from Kirkuk to Tripoli and the subsequent doubling of capacity at Haifa were mentioned earlier.<sup>1</sup> These developments helped to meet the rising black oil demands at the eastern end of the Mediterranean. Far

<sup>1</sup> See p. 380.



more important was the increase in output at the Abadan refinery. Before the middle of 1943 this huge plant, capable of producing 13 million tons of products a year, was compelled, for 'short-haul'

TABLE 46  
Output of Eastern Refineries 1942-45††

	Main exporting plants			Local plants			
	Haifa	Abadan	Bahrain	Near East‡	Persian Gulf§	India	
1939	White products*	18	2,653	609	128	115	173
	Black products†	53	5,693	336	340	97	46
	Total	71	8,346	945¶	468	212	219
1942	White products*	723	2,307	618	270	165	192
	Black products†	1,222	6,016	452	815	135	77
	Total	1,945	8,323	1,070¶	1,085	300	269
1943	White products*	763	2,934	614	286	211	203
	Black products†	1,862	5,600	414	924	517	83
	Total	2,625	8,534	1,028¶	1,210	728	286
1944	White products*	869	3,979	658	299	158	181
	Black products†	2,303	7,967	748	975	496	99
	Total	3,172	11,946	1,406**	1,274	654	280
July 1944- June 1945	White products*	1,060	4,240	809	290	160	151
	Black products†	2,660	8,826	1,298	931	272	105
	Total	3,720	13,066	2,107**	1,221	432	256

†† Excluding bitumen and other non-liquid products.

\* Including jute batching oil.

† Gas oil, diesel oil, fuel oil and lubricating oil, including fuel oil used as refinery fuel.

‡ Suez and Tripoli refineries.

§ Alwand, Kermanshah and Kirkuk refineries.

|| Digboi and Rawalpindi refineries.

¶ Exports.

\*\* Production includes aviation spirit components transferred to Abadan for processing.

reasons, to work well below capacity. In the autumn of 1941 its rate of output was down to only five million tons a year. Even after Pearl Harbour and the expansion of the Middle Eastern fighting, Abadan's capacity was still in excess of requirements. Indeed, in the middle of 1942 the Anglo-Iranian Oil Company concluded an agreement with Caltex to limit refinery output in the Persian Gulf under which the output of the Abadan plant was held to a limit representing only

70 per cent. of its potential.<sup>1</sup> One of the main problems at Abadan was the surplus of fuel oil output. Designed mainly to supply Admiralty needs, the Abadan refinery was operated in the war years to produce a maximum proportion of white oil products. The unwanted black oils produced during the refining process were disposed of by 'recycling', that is by returning them to the ground. In the twelve months following the agreement with Caltex 2.4 million tons was disposed of in this way. The significance of this surplus capacity in the later years of the war was that Abadan was able to meet almost all new demands in the Indian Ocean area (including supplying a bigger share of Australia's needs)<sup>2</sup>; in addition from the spring of 1944 it was also able, together with Bahrain, to contribute to the supply of the United States Navy in the South-West Pacific.<sup>3</sup>

One product stands out, however, from this picture of self-sufficiency east of Suez in the later years of the war. Despite all the effort and resources devoted to increasing the production of 100-octane spirit in the Persian Gulf it continued to fall increasingly behind Eastern requirements. From the autumn of 1943 growing quantities had to be shipped from the United States to Calcutta and other ports in eastern India, mainly by 'Greyhounds' sailing both through the Mediterranean and across the Pacific and around Australia. The size of these shipments was in part a reflection of the mounting aviation effort in South-East Asia; but they were also partly due to the diversion, after the middle of 1943, of a growing part of Abadan's output outside the Indian Ocean area altogether. These diverted supplies went to Russia.

The idea of supplying the Soviet Union with 100-octane spirit from Abadan dated back to the autumn of 1941; indeed, the first 100-octane extension to the refinery had been conceived with precisely this purpose in mind. There were obvious transport difficulties, since road and rail communications from the Persian Gulf were undeveloped; the main road from Tehran stretched only as far south as Dizful and the railway reached the south coast at Bandar Shahpur, far to the east of Abadan. For the next two years the Russians received their supplies of 100-octane spirit by shipments direct from the United States to their Arctic ports. However, when in the spring of 1943 Arctic convoy sailings were interrupted, some 40,000 tons of Russia-bound aviation fuel was diverted to Britain instead.

<sup>1</sup> Bahrain's output was held to the average of the previous three years, which allowed it to work at 90 per cent. capacity. The agreement followed a dispute between the two oil companies in which each invoked the support of its government.

<sup>2</sup> In the autumn of 1944 London took over responsibility for supplies previously furnished by the Americans, while the Americans agreed to supply British Service needs in the forward Pacific areas.

<sup>3</sup> This oil was supplied under Reciprocal Aid and carried in United States tonnage.

The Russians then suggested that these supplies due to them should be replaced by supplies from Abadan. The British rejected the idea that they were under a financial obligation to replace them; but, in view of Russia's need they offered to supply 5,000 tons from Abadan during the month of June and a total of 30,000 tons between July and September 1943.

Meanwhile the Americans and Russians were in the process of negotiating the third of the annual 'Protocols' which regulated the flow of United States supplies to Russia. Now that deliveries of aviation spirit across Iran had started there seemed no reason to discontinue them; and the Russians for their part preferred to receive some supplies in the south. The Russians therefore proposed that during the Protocol period July 1943 to June 1944 they should take only 360,000 tons of 100-octane spirit from the United States instead of 565,000 tons originally contemplated, provided that 10,000 tons a month was also delivered from Abadan; 10,000 tons was fixed as the maximum that transport capacity across Iran could handle. The British gave their consent on the understanding that the Americans would ship equivalent quantities to those areas in the East which otherwise would have received the Abadan supplies sent to Russia. The Americans agreed to this, although it involved them in a much longer sea delivery than supplying the North Russian ports. The third Soviet-American Protocol, embodying this arrangement, was signed on 19th October 1943; under it the supplies from Abadan counted as American lend-lease aid to Russia.

The deliveries of 100-octane spirit from Abadan were maintained and expanded under the Fourth Protocol, covering the year 1944-45. By that time increased transport capacity across Iran had made it possible to raise the monthly supply commitment from Abadan to 20,000 tons of 100-octane spirit and 5,000 tons of 'alkylates'; these 'alkylates' were surplus to requirements at Abadan. Apart from these deliveries under the Protocol additional quantities were also transported for *Frantic*, the code name for an American project to operate bombers from bases in South Russia. Nothing ultimately came of *Frantic*, but supplies for it continued and were delivered to the Russians.

The deliveries of aviation spirit actually made from Abadan to Russia varied considerably from month to month. They were negotiated monthly between the Petroleum Department and the Soviet Trade Delegation in London, and subsequently 'allocated' by the Aviation Petroleum Products London Assignment Committee. On occasions it proved impossible to deliver the precise amounts stipulated. More often the supplies delivered were greatly in excess of, rather than less than, these set amounts. The Russians always pressed for delivery up to the limit of transport capacity. But there was no

means of weighing their demands against the claims of other war theatres since the Russians provided no statistical backing for their demands. The British therefore took the view that their own needs must take priority over those Russian demands in excess of commitments under the Protocols. The British were willing to supply any output which was surplus to their own needs; but otherwise London would only agree to allocate supplies from Abadan against *concurrent* replacement from American sources. In practice, therefore, deliveries in excess of the Protocol commitments (and the deliveries for *Frantic*) were governed by the availability of tankers to ship replacements from the western hemisphere to India. Total deliveries of aviation spirit and components from Abadan to the Soviet Union between June 1943 and May 1945 (when lend-lease aid to Russia stopped) amounted to 542,000 tons; more than two-thirds of this was sent between July 1944 and May 1945.

(ii)

### The Middle East

During the last two years of the war the supply problems east of Suez were problems, not of shipping, but of distribution on land. There was a need to improve land transport facilities both in the Middle East and in the Indian theatre. Within the Middle East the main task after mid-1943 was to provide for increased oil movements within Iran where increasing 'Aid to Russia' traffic was accompanied by a rising civilian demand for black oils owing to the high price of solid fuel. Calculations arrived at early in 1943 indicated that movements of white products and diesel oil alone from Abadan into the interior would build up to 500,000 tons a year compared with the 200,000 tons transported over 1942. On top of this task came the commitment in the middle of 1943 to deliver aviation spirit to Russia.

Since the roads and railways were already overburdened, the obvious solution was to lay more pipelines. Unfortunately supplies of pipe were limited; but the authorities in Iran did the best they could with what was on hand. It will be recalled that during 1941 and 1942 they had devoted most effort to improving facilities north of Ahwaz; from that town two new pipelines, one for white products and one for fuel oil, had been laid to Andimeshk, the nearest point on the railway to the road terminus at Dizful. A decision was now taken to use both pipelines for white products; because white products could be pumped more quickly than heavier oils, the throughput capacity of

the pipelines was thus increased by 150,000 tons a year. But the main effort in 1943 went into improving the section of the route between Ahwaz and Abadan itself.<sup>1</sup> To move oil between these two points, the Anglo-Iranian Oil Company had hitherto relied on a pipeline laid in peace-time to supply all products to the Iranian interior. Now, from the middle of 1943, it also began to pump white products up a pipeline built to 'recycle' unwanted black products back to the oilfields. This pipeline passed within six miles of Ahwaz, and it was a simple matter to link it to that town by a 6-inch line in August 1943. Between them these 'products' and 'surplus products' pipelines were able to carry from Abadan all the petrol and paraffin needed in the interior, including the requirements of the 'Aid to Russia' traffic. But the 'surplus products' pipeline was available only to the extent that there was no black oil surplus. Although offtake of black oils from Abadan was increasing there could be no guarantee that this trend would continue to make 'recycling' unnecessary in the future. Accordingly, as an insurance, it was decided to use some 4-inch pipe brought from Egypt to lay another white oil line up to Ahwaz. The pipe was found to be in bad condition but it was thought that it might give a year of service before corrosion put it out of action. In fact the line was not ready for use until March 1944 and it became unserviceable within a month. Fortunately there was never any need to use it.

The pipeline system stretching into the interior from Abadan fed rail and road traffic carrying supplies other than oil to Russia. Aviation spirit for Russia was carried by the railways. At the end of 1941 it will be recalled there had been neither rail nor road connections between the Abadan refinery and the interior of Iran. By the autumn of 1943 the town of Khorramshahr, on the mainland opposite Abadan island, had been developed as a port and had been connected by road and rail to the main transport routes.<sup>2</sup> At first the aviation spirit was taken across from Abadan island by barge. But early in November 1943 a sixteen-mile long pipeline was opened from the refinery to Khorramshahr. Twelve months later a second pipeline was completed to assist in meeting a request for the delivery of motor fuel to Russia. Nothing came of this request and this second pipeline was used exclusively for supplying Iran's internal needs.

From Khorramshahr, aviation spirit for Russia went north in special trains running straight through to the Caspian Sea. At first supplies were nearly all transported in 'packed' form (drums supplemented in the early stages by 4-gallon 'flimsies') because there were few tank cars available. Later fifty tank cars were brought from

other parts of the Middle East and more from the United States; between May 1943 and May 1945 the number of tank cars employed on the Iranian railways was doubled. Tank car handling also improved under American military management: the United States Persian Gulf Command took over the running of the Iranian railways in the autumn of 1942. The Russians also achieved a faster rate of tank car turn-round in their own zone as time went on. Bulk movements of aviation spirit to Russia by rail averaged only 2,000 tons a month over the last half of 1943; between May 1944 and April 1945 bulk movements averaged over 23,000 tons a month.

'Aid to Russia' traffic was not the only new supply commitment which called for extra distribution facilities in the Middle East theatre after the middle of 1943. In the later years of the war Middle East airfields were used as staging-points by aircraft flying out to the Far East. One of the most important of these staging-points was Cairo. The growing demand for aviation fuel here finally led to a decision to lay a pipeline from Suez to Cairo, with connections to the airfields.<sup>1</sup>

The construction of such a pipeline had been considered many times before. Shell had proposed one as long ago as 1938 when they expanded their Suez refinery. The British government, naturally favourable to a project which would tend to divert 'low-flash point' supplies for Cairo away from the naval base of Alexandria, had supported the company. But the Egyptian government, concerned at the prospective loss of freight by the State railway system, had laid down terms which the company would not accept. In December 1940 the project was revived as a war measure to release tank waggons and tank lorries for use to supply the Forces in the Western Desert. It was revived again in 1941 as part of the larger scheme to connect Suez with Alexandria via Cairo; and revived yet again in 1942 at a time when all the available pipe was bespoke for the proposed line from Alexandria into the Western Desert. Eventually, in February 1943, when it had become clear that the Western Desert line would not be needed, sanction was finally given for the Cairo-Suez pipeline. The Egyptian government was still unenthusiastic but the growing need for aviation spirit in the Cairo area carried the day.

Work on the pipeline was completed in August 1943, and it came into operation in October. The pipeline ran from the 'covered' military storage to the west of Suez for seventy miles to the Cairo suburb of Ghamra, where 6,000 tons of new storage was installed. From Ghamra there was a pipeline extension to an aviation petrol depot at Almaza which supplied two airfields. Down to the end of June 1945 an average of 830 tons a day was delivered through this 6-inch line.

<sup>1</sup> See Map facing p. 229.

<sup>2</sup> See *ibid.*

<sup>1</sup> See Map facing p. 229.

Not all of this was aviation spirit. Roughly 80 per cent. was petrol and paraffin for civil use in the Cairo area and in Upper Egypt.

New pipelines were also laid to supply two other important aircraft staging-points at Shaiba and Habbaniyah in Iraq. Pipe which became available from Egypt was used to lay a white oil line from Abadan refinery to Shaiba, and also another smaller line from Baghdad to Habbaniyah, the Royal Air Force base fifty-six miles to the west of Baghdad. The supplies for Habbaniyah were to be railed up to Baghdad from Shaiba, with the aid of thirty-seven tank cars to be sent from Britain.

Sanction for these projects was given in June 1944 and by October the line to Shaiba had been laid. However it was the spring of 1945 before all the tank cars arrived from Britain; and even then the Baghdad-Habbaniyah pipeline was not ready for use. Because the Anglo-Iranian Oil Company had no staff to spare for construction, the line was laid by the Army working with inexperienced local labour. It was not completed in March 1945 and then had to be taken up again and relaid by the oil company. Meanwhile the supplies for Habbaniyah had to be carried from Baghdad by road. The summer was well advanced and the war was nearly over when the new line finally came into use.

### (iii)

#### Bengal and Assam

Far and away the biggest Eastern supply problem during the final two years of the war was how to meet increasing British and American Service needs in Bengal and Assam. Down to the autumn of 1943 these needs had been only moderate. The British retreat to Imphal in May 1942 had been followed by a lull on the north-east border of India, interrupted only by a British foray into the Arakan, which lasted until the end of the 1943 monsoon season. Then another British thrust into Arakan and an American-Chinese advance into Upper Burma were followed by a Japanese attack in the central area which was halted in the spring of 1944, after stiff fighting near Kohima and Imphal. When the next campaigning season began in the autumn of 1944 the British swept forward into Burma in an operation which ended triumphantly in May 1945 with the fall of Rangoon and the destruction of the Japanese forces there. Meanwhile the Americans had been developing a huge airlift—the so-called 'Hump' operation—over the Himalayas into China. The 'Hump' flights took off from

a string of new airfields in Bengal and Assam. Figures of the oil required for these operations are not available. But in the Indian theatre as a whole ten times as much aviation fuel was consumed between October 1943 and September 1944 than in the calendar year 1942; and consumption doubled again over the following twelve months. As for petrol, consumption by the Armed Forces rose from 138,000 tons in 1942 to over a million tons in the final twelve months down to September 1945.

These oil supplies were delivered partly by direct shipment to Calcutta, and partly through overland movements from Bombay, benefiting, after August 1943, from the new Bombay-Bhusawal pipeline.<sup>1</sup> The continuance of these large-scale overland movements after the ban on east coast shipments had been relaxed, did not pass unquestioned. In the second half of 1943 the Indian railways were under heavy pressure because, in addition to war material, they were called upon to undertake large movements of grain from the Punjab to relieve food shortage in Bengal and Assam. To make matters worse the monsoon season of 1943 ended in floods which, for over three months cut the main railway lines leading into Calcutta from the west. Yet in the middle of 1944 petrol and aviation spirit was being transported from Bombay to Bengal and Assam at a rate of some 35,000 tons a month; and between 13,000 and 14,000 tons of paraffin a month was being sent from west coast ports to areas normally fed from the east coast.

The fact was that even when working full out the Indian east coast ports could not cope unaided with military requirements in Bengal and Assam in addition to civilian supplies for that area. The authorities strove to improve their capacity in the autumn and winter of 1943-44. They concentrated particularly on Calcutta, the main oil port for Bengal. The Calcutta oil installations were at Budge Budge, fourteen miles down river from the city, where the water was as deep as in the Thames Estuary and there were enough four-buoy moorings to receive three tankers simultaneously. In the autumn of 1943, however, only one of these Budge Budge moorings was long enough to receive a 'Greyhound'. By April 1944 the other two had been lengthened and a fourth set of moorings had been added and equipped with a discharge line.

However, there was a serious drawback to using Budge Budge as a major ocean terminal. In peace-time it had received supplies in the small shallow-draught vessels used on the coastwise voyage from Rangoon and the approach up the Hooghly river was not deep enough to take ocean-going vessels fully laden. Not only 'Greyhounds' but even HX class tankers, drawing about 29 feet fully laden,

<sup>1</sup> See p. 351 and Map facing p. 466.

had to 'lighten' by partial discharge before they could even reach Diamond Harbour which was not as far up as Budge Budge; and because of tidal patterns they could accomplish this voyage only twelve days in the month. To proceed to Budge Budge they had to lighten even more. All this wasted time, particularly when traffic was heavy. Even more serious was the fact that it was impossible for fully laden tankers to cross the Hooghly bar at all; and owing to swell and weather conditions they could not 'lighten' in the open sea outside. 'Greyhound' tankers had to discharge between a quarter and a third of their cargoes to get across the bar.

It was impossible to allow the waste of tanker space involved in sailing tankers all the way to Calcutta only partly loaded. In practice therefore incoming tankers first called at Madras to discharge part of their cargoes. This was wasteful of tanker time because it involved two-port handling. One solution considered was to run a ferry service of smaller tankers between Madras and Calcutta; it was reckoned that eleven such vessels making two trips a month could deliver over a million tons a year to Calcutta and Chittagong. But the authorities finally decided to continue with the system of partial discharge at Madras, and to inaugurate a less ambitious ferry service which would only carry to Calcutta supplies that were surplus to local requirements. To handle this traffic another tanker berth and 13,000 tons of storage was provided at Madras.

This arrangement remained in force down to the spring of 1945. But it was never regarded as more than temporary; for Madras, with its small artificial harbour, was unsuitable for use as a major oil transit port. To have achieved an adequate speed of handling, port safety regulations would have to be rescinded. The port authorities were opposed to this move since the region was subject to cyclones, which could break pipe connections and spill petrol into the harbour. In any case it was intended to use Madras as a base for other supplies during the projected next phase of the eastern war—which was to be a British offensive through the East Indies. The Services looked coldly at the prospect of tankers carrying petrol and aviation spirit discharging while the harbour was filled with their own supply ships; and the Navy was not prepared to allow warships to use Madras under these conditions. Finally, the port could never cope with the level of oil traffic expected during 1945–46 when the American airlift to China was to be greatly stepped up.

For all these reasons a search for an alternative to Madras as a port where tankers could partly discharge went on through much of 1944. The best prospect was Vizagapatam, which had suitable tanker berths and the advantage of being 400 miles nearer to Calcutta. This was a naval base however and the Navy refused to let it be used as an alternative to Madras. There were two other oil ports along the

Indian east coast, Coconada and the French port of Karikal. But both were small and their oil storage tanks had been moved to more important ports. In Ceylon, Trincomalee would have been suitable. But this was now the main Allied naval base in the Indian Ocean and the Navy was unwilling to have white oil tankers discharging there permanently, although they said it could be used while Madras was closed.

In May 1944, the oil companies suggested a scheme for 'lightening' Calcutta-bound tankers by overside discharge in the Palk Straits which separate India from Ceylon.<sup>1</sup> Tanker moorings would have to be laid but the special advantage of the location was that an anchorage there would be sheltered by the land on either side from both the south-west and north-east monsoons, which made discharge outside harbour impossible off west-facing coasts between May and October, and off east-facing coasts between November and April. The proposal was referred to London and endorsed by the Service supply chiefs there in August 1944. Two anchorages were selected, one south of Punkadutivu for use during the north-east monsoon; and one five miles south-east of Pt. Pedro for use when the south-west monsoon was blowing. Each anchorage was to contain moorings for four tankers, which could either load or discharge. There was also to be a central berth connected to the other berths by floating pipelines. Here a depot tanker—the selected vessel was the 21,000 dead-weight ton *San Felix*—was to be moored. The *San Felix* provided 15,000 tons of 'balance tankage' and carried 3,000 tons of bunkers on which incoming tankers could draw at need. Work on this scheme began in late 1944 and was completed early in 1945.

It was intended that the Palk Strait anchorages should be used by tankers bound not only for Calcutta, but also for other Bay of Bengal ports—including, possibly, Rangoon when captured—which lacked sufficient depth of water. Among these other ports the best-placed for supplying the Assam war front was Chittagong, a small port seven miles up the river Karnaphuli. Chittagong had been reopened in 1943 to assist the British thrust into the Arakan, and now acted as supply port for the Imphal sector where the main British forces were concentrated. Chittagong had neither depth of water nor mooring space sufficient to take tankers of more than 6,000 tons capacity, and it had to be supplied by a shuttle service provided by two small tankers lifting oil, sometimes from Calcutta and Madras, and sometimes direct from Abadan. In the spring of 1944 the Americans presented a proposal to develop a major oil port capable of handling 'Greyhounds' at the mouth of the Karnaphuli river. It was a main object of their strategy to reopen land communications with China and to establish

<sup>1</sup> See Map facing p. 466.

a heavy bomber force there from which to raid the Japanese homeland. The Americans chose Chittagong as the supply port for this force because it was the nearest to their railhead at Ledo.

The Chittagong development scheme was approved at the end of 1944 after a survey to check the depth of the water. Work began early in 1945 on installing two four-buoy tanker berths on the north side of the river mouth. 100,000 tons of new tankage was obtained from the United States for erection on the south side of the river; this was to be connected by pipeline with the new berths. The pipelines proved unexpectedly difficult to lay, however, and the scheme was still unfinished when the war ended.

Supporting the expansion of oil port facilities, the Allies also provided better means for moving oil inland to the remote fighting fronts. The main line of supply to Assam began at Calcutta, which was not only the largest port in the area but also the terminus of most of the railway routes crossing India from the west.<sup>1</sup> In the early days of the Assam campaigns most of the oil for the front line Forces went by rail to the railhead at Dimapur; by the spring of 1943 the capacity of this line had been increased from four trains a day to fourteen. But rail transport had grave disadvantages. The railway approach to Dimapur both from Calcutta and from central India was impeded by the obstacle of change of gauge, since the Dimapur railway was a metre-gauge system. Furthermore, in the path of the railway lay the river Brahmaputra, which was unbridged (and virtually unbridgeable) because of frequent flooding and changes of course. The river therefore had to be crossed by a waggon ferry at Gauhati. The bottlenecks at this crossing, and at the railway junctions of Parbatipur and Santahar, where the change of gauge took place, made heavy demands on waggons; in particular a shortage of the metre-gauge waggons developed after the beginning of the Arakan fighting. A final obstacle was that the line between Parbatipur and the ferry, running as it did between the Brahmaputra and the Himalayas, was often flooded. This happened in 1942, and again in 1943.

Accordingly, the rail route from Calcutta was increasingly supplemented by river transport. There was a navigable route all the way to Dibrugarh, a river port which was connected by rail through Digboi to the American railhead at Ledo. When the line through Parbatipur was flooded in 1942 the oil company assembled a barge fleet to move the products of the Digboi refinery down into Bengal. This fleet was also used to move supplies in the opposite direction. In 1943 the Americans commenced a programme to build 850 barges, each with a capacity of between 100 and 150 tons, to

move aviation spirit up the river into north-east Assam; and ports on the river were connected by pipelines to the airfields of north-east Assam as well as Tinsukia and Digboi. However, the river traffic, like the rail traffic, was liable to interruption. There was a seasonal rise and fall of twenty-five feet on the river Brahmaputra. Dibrugarh was flooded at high water, and subject to shoaling when the tide was low. None of the river ports could be used all the year round.

These shortcomings, together with growing demands for oil, made it necessary to lay pipelines to supplement the rail and river routes. At the *Quadrant* Conference in August 1943 the Combined Chiefs of Staff authorised two 6-inch lines to be laid from Calcutta up into China. Work on the first began shortly afterwards: it was laid along the railway to Parbatipur and then eastwards along the river to a tank farm at Tinsukia, near Dibrugarh. Work on this was completed in the summer of 1943. Meanwhile, in November 1943 it was decided that the extension from Tinsukia to Myitkyina should be composed of two 4-inch lines. These were laid alongside the newly-constructed road from Ledo, one being used to provide petrol for traffic on the road and the other to supply nearby airfields, and were finished in October and November 1944. Work on sections beyond Myitkyina continued into 1945. By June one 4-inch line had been laid by way of Bhamo all the way to Kunming—a distance from Calcutta of over 1,700 miles. The second line was taken only to Bhamo. Meanwhile in the period following the *Quadrant* Conference the Americans had also laid a sixty-mile long pipeline from Calcutta to Kharagpur to supply their new airfields in West Bengal; this line was completed in March 1944.

The second American 6-inch pipeline to China authorised at *Quadrant* was laid, not from Calcutta, but from Chittagong as an adjunct to the development of port facilities at Chittagong. This route to Tinsukia had the advantage of being some 200 miles shorter than that from Calcutta and of being convenient for the supply of airfields in east Bengal. Work on the American 6-inch line began in October 1944. It was laid along the railway through Dimapur to Tinsukia and then on to Myitkyina, which was reached in June 1945. Meanwhile, in the spring of 1945, the idea of extending it on to Kunming was dropped.<sup>1</sup>

The British, whose forces were operating from a railhead at Dimapur, not Ledo, had been making their own distribution arrangements. Their main supply port had always been Chittagong, and ever since 1942 they had been planning to supplement the 450-mile long metre-gauge railway between Chittagong and Dimapur by

<sup>1</sup> See Map facing p. 466.

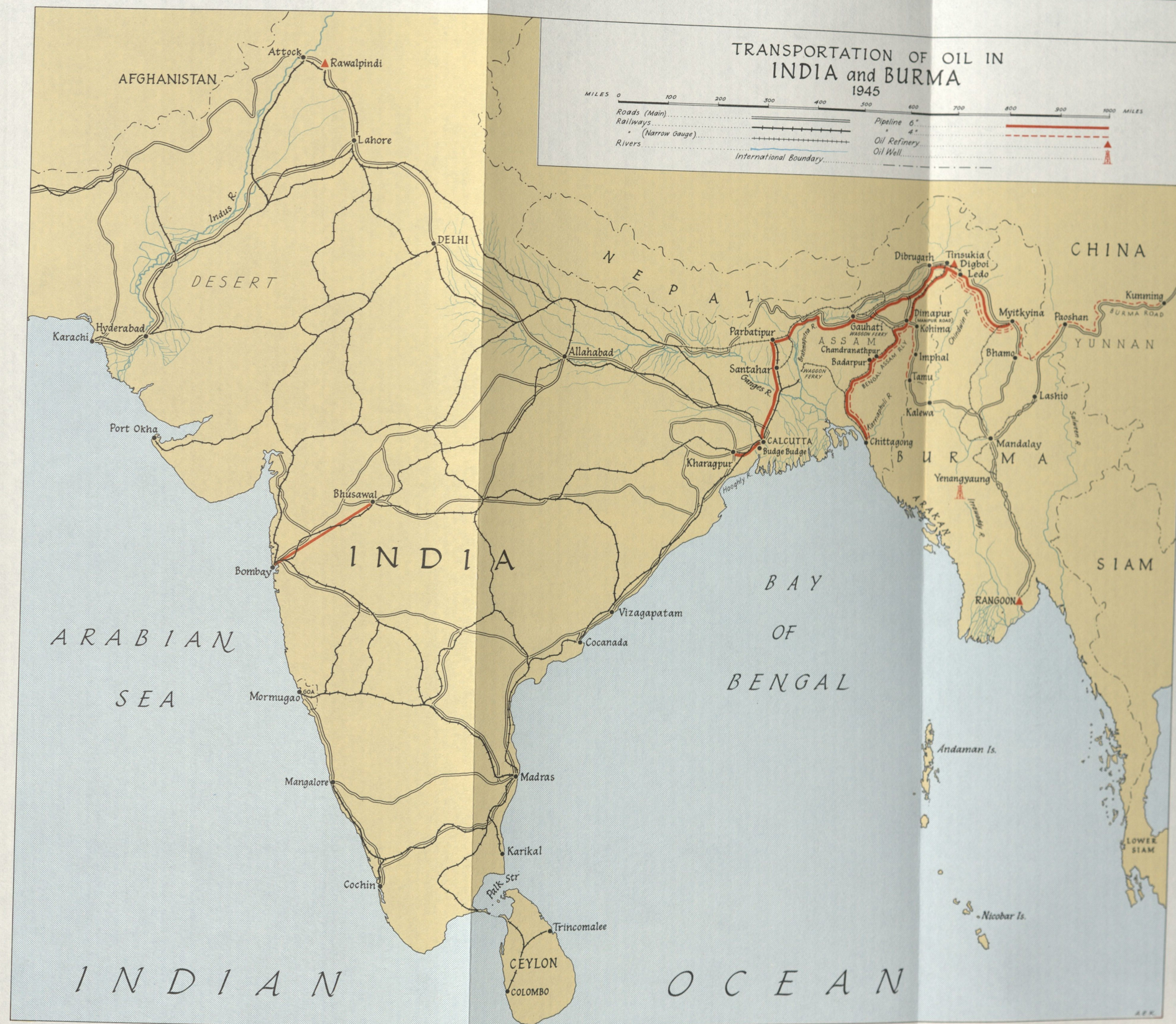
<sup>1</sup> For a fuller account see S. Woodburn Kirby, *The War Against Japan*, Vol. IV (H.M.S.O. 1965).

a pipeline. In the summer of that year the Overseas Development Sub-Committee in London authorised an order for 650 miles of 4-inch pipe from the United States. The intention was to connect Chittagong with Dimapur and then continue the line forward along the Manipur Road—which was the main supply artery to the front—through Imphal and Tamu to Kalewa. But work was held up by delays in deliveries of stores and by the battles around Kohima and Imphal. The section between Chandranathpur and Dimapur was the first to be completed but did not come into operation until March 1944; the section between Chandranathpur and Chittagong was not finished until February 1945. Meanwhile the line had been taken forward from Dimapur along the Manipur Road until it reached Tamu, 66 miles beyond Imphal, in May 1945. By then Rangoon had been recaptured and the Burma campaign was virtually at an end.

Thus ends the record of events in 1944 and 1945 which properly fall within the scope of a history of oil supply in the Second World War. Yet even while these final efforts of the war were being made Ministers and officials on both sides of the Atlantic were preparing for the new circumstances of the post-war world. Among other plans they were discussing the convening of an International Petroleum Conference of all oil producing and consuming countries, and the establishment of a permanent International Petroleum Council. These Anglo-American discussions need not concern us here. Other talks on lend-lease accounting did, however, directly affect the handling of war-time supply problems. They will be dealt with in the next chapter, which will also take a final look at the administrative machine and appraise the working of the war-time alliance between British and Americans so far as oil was concerned.

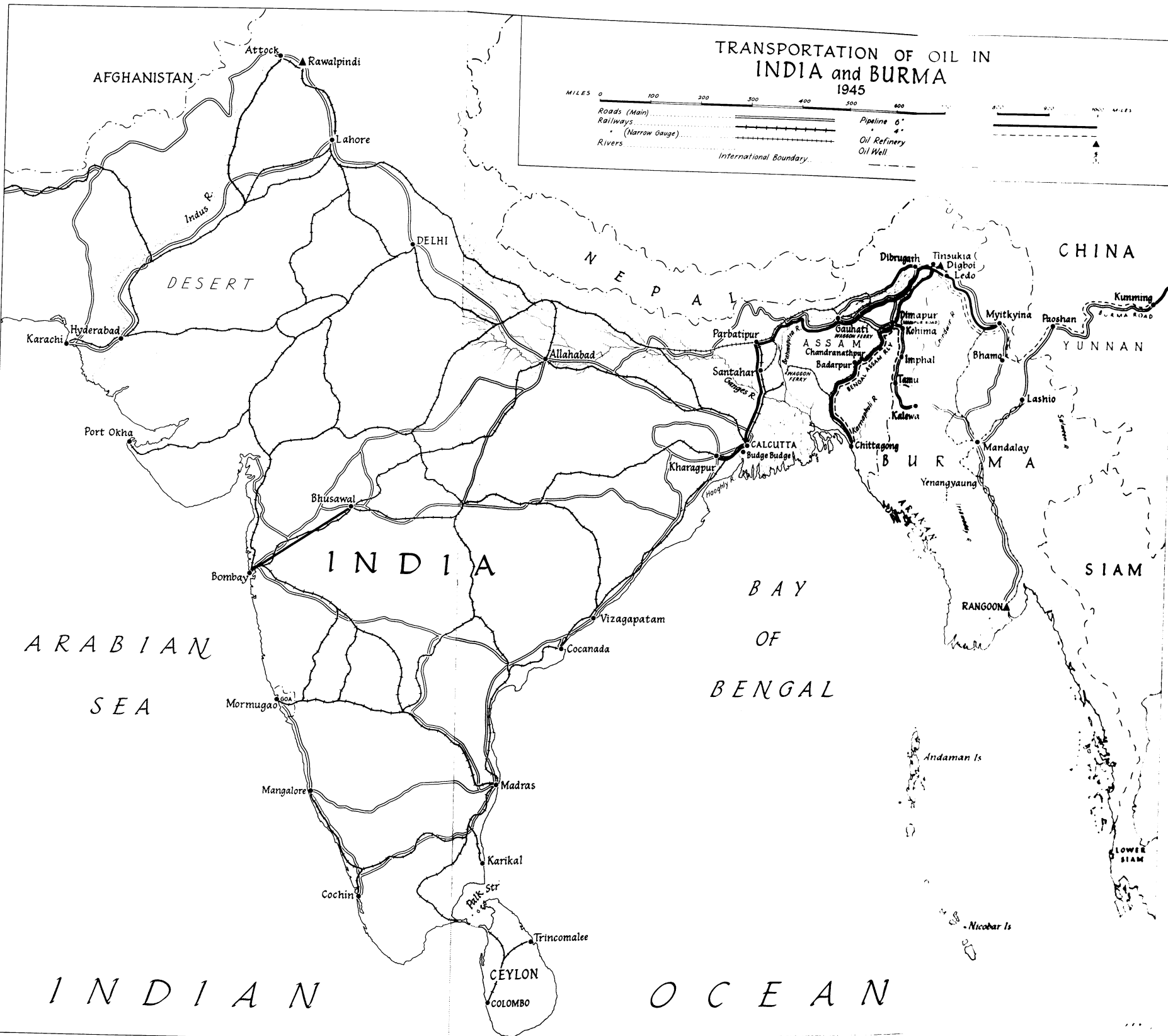
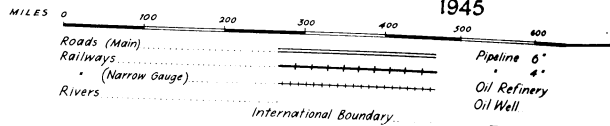
pipeline. In the summer of that year the Overseas Development sub-Committee in London authorised an order for 650 miles of such pipe from the United States. The intention was to connect Chittagong with Dimapur and then continue the line forward along the Manipur Road—which was the main supply artery to the front—through Imphal and Tama to Kalewa. But work was held up by delays in deliveries of stores and by the battles around Kohima and Imphal. The section between Chandranathpur and Dimapur was the first to be completed but did not come into operation until March 1944; the section between Chandranathpur and Chittagong was not finished until February 1945. Meanwhile the line had been taken forward from Dimapur along the Manipur Road until it reached Tama, 66 miles beyond Imphal, in May 1945. By then Rangoon had been recaptured and the Burma campaign was virtually at an end.

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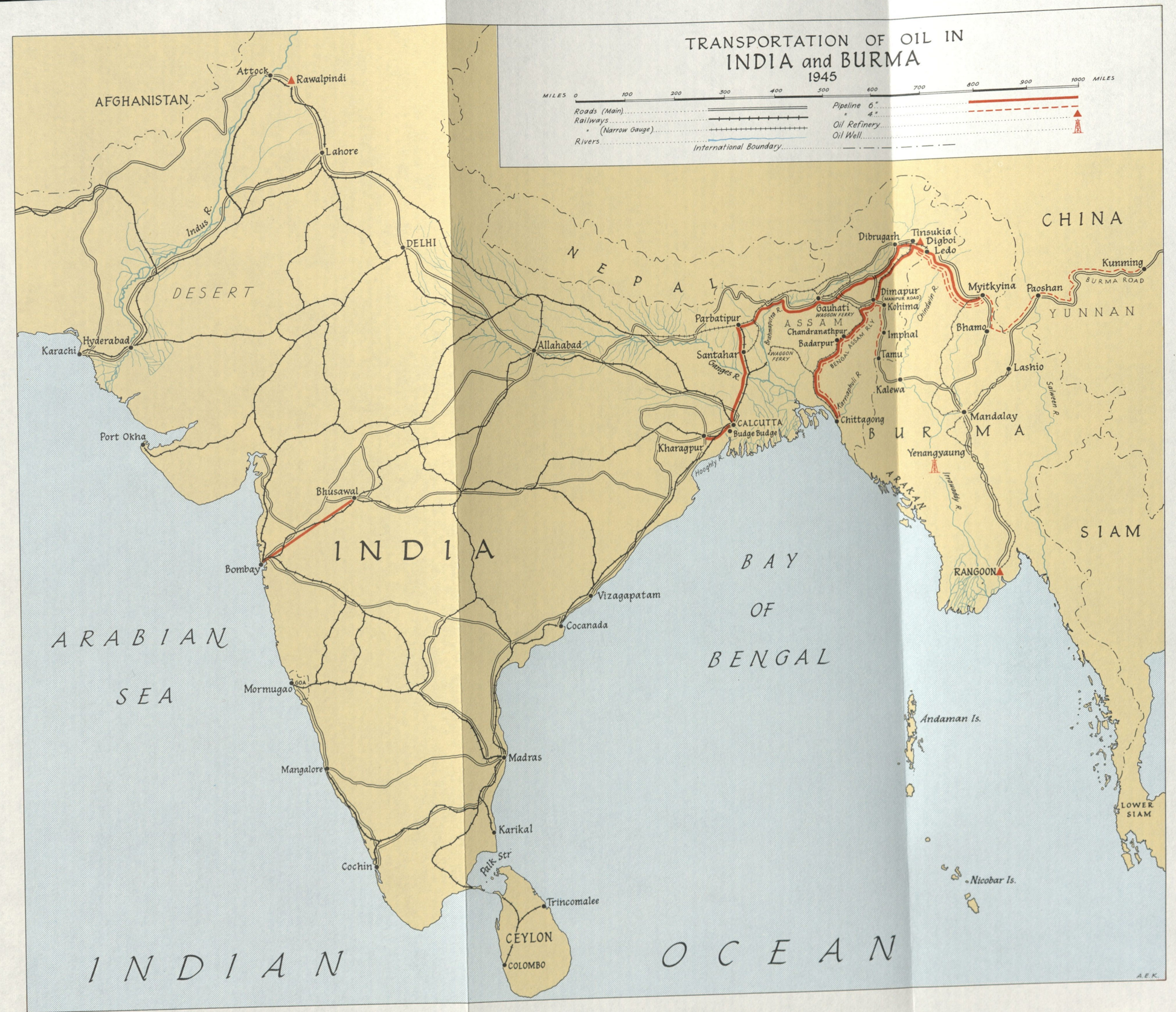
# TRANSPORTATION OF OIL IN INDIA and BURMA 1945



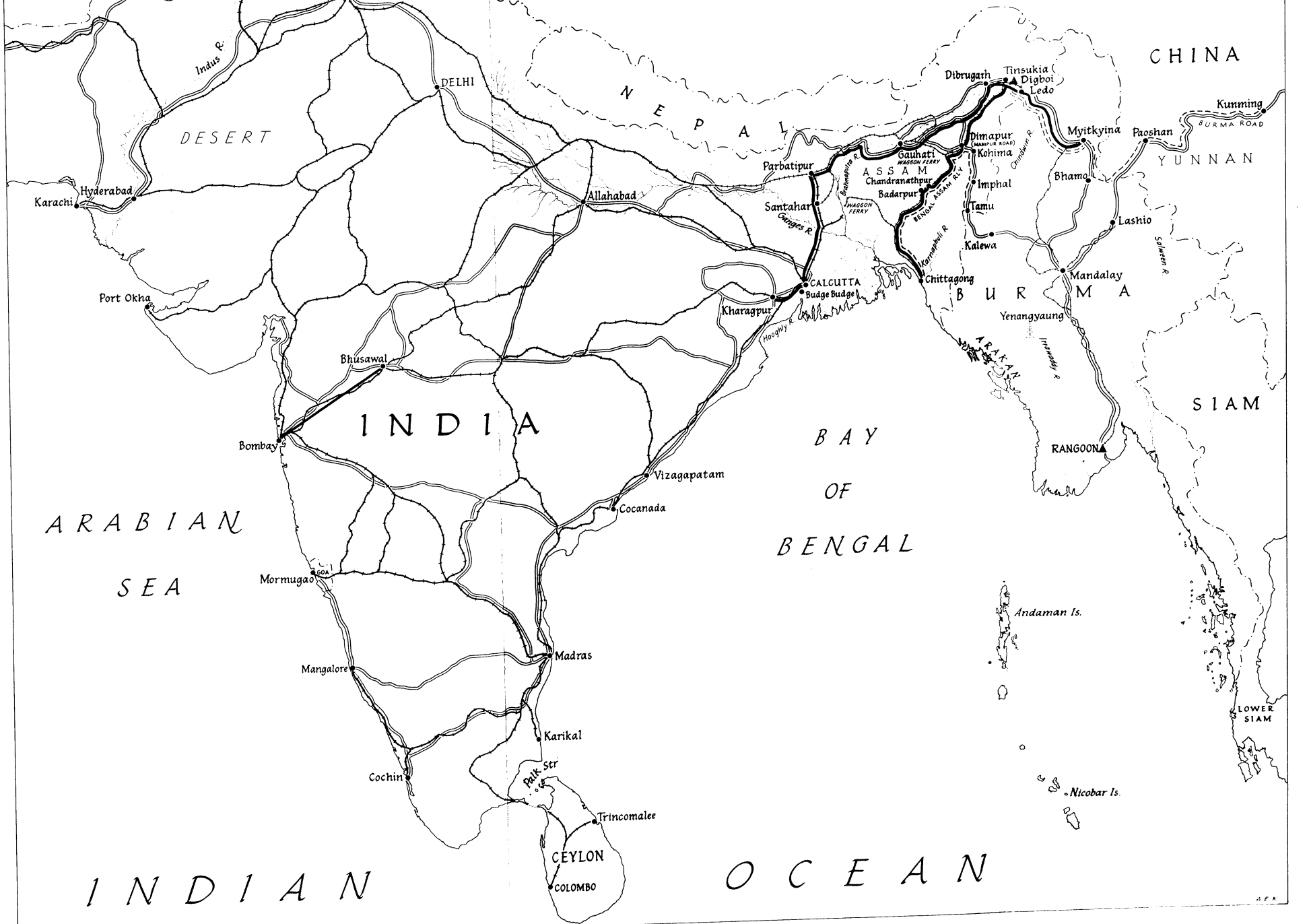
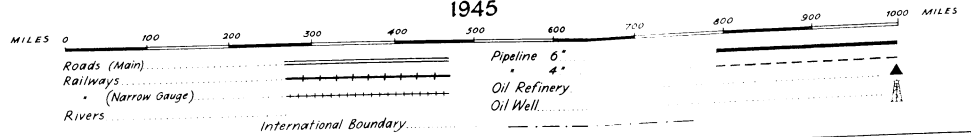
Ch. XXI: THE EAST

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# TRANSPORTATION OF OIL IN INDIA and BURMA 1945



INDIAN

OCEAN

## CHAPTER XXII

### FINAL RECKONING

(i)

#### Lend-Lease Accounting

THE disagreements over allocation described in Chapter XIX were disagreements over strategic priorities: at stake was the efficient prosecution of the war. It became evident, however, that some Americans at this time suspected the British of using American aid to strengthen the United Kingdom's post-war position. Certainly many Americans were themselves taking a longer view during the final two years of the war; they felt that their country was denuding itself of material wealth to the advantage of her Allies—a feeling which found expression in a more critical attitude towards the provision of supplies under lend-lease arrangements.

This trend of opinion began to show during the mid-term elections to the United States Congress in the autumn of 1942. The opinion was encouraged by the rise of the United Kingdom's gold reserves from the dangerously low level to which they had sunk when lend-lease was introduced. Where oil was concerned the traditional rivalry with the British, going back to the First World War, gave special sharpness to this growing discontent. The ancient fears that American oil reserves would soon be exhausted were revived; some pundits asserted that at the existing rate of consumption those reserves would only last for about fourteen years. Britain, on the other hand was thought to be sitting on vast oil reserves in the Middle East which would enable her to 'hold America to ransom' after the war. During the summer of 1943 there was widespread American press coverage of the 'oil problem'; and the United States Joint Chiefs of Staff submitted a report to the President in June on 'the dangerous depletion' of United States oil resources.<sup>1</sup> That autumn American anxieties were fanned to a peak with the return of five Senators<sup>2</sup>

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<sup>1</sup> See B. Shwadran, *The Middle East, Oil and the Great Powers*, p. 312 (Atlantic Press 1956).

<sup>2</sup> Senators Ralph O. Brewster, Henry Cabot Lodge, James M. Meade, Albert B. Chandler and Richard B. Russell.

from a tour of the war theatres. The Senators asserted that while America, from her dwindling reserves, was supplying Britain and the Empire with vast quantities of oil under lend-lease, British-controlled resources in the Persian Gulf were only being used to 60 per cent. capacity. In November and December 1943 Republican Senator Ralph O. Brewster spoke a number of times on this theme. He said that the reason why Britain was not contributing more of her own oil to the war effort was, first: that the American administration had not asked her to; and secondly, that British oil companies were only willing to expand their refineries if they received lend-lease materials from the American government. He added for good measure that American oil companies, on the other hand, were willing to use their own money. These charges were refuted by the Administration both in Congress and in a public statement by the President. The 'short-haul' policy that had led to the Persian Gulf refineries being under-employed was fully explained, and an account was given of the efforts of the Anglo-Iranian Oil Company to expand the output of 100-octane spirit at Abadan. The annual report to Congress on Lend-Lease pointed out that the United States was supplying far less petroleum to foreign countries during 1943 than in 1938: 88 per cent. of American oil output in 1943 was being consumed by Americans themselves. But anxiety over depletion of United States oil reserves continued. In February 1944 the Senate set up an investigating committee to look into the whole question.

In a political climate of this kind it was hardly surprising that the United States Administration should have adopted an increasingly restrictive attitude towards the allocation of oil under lend-lease. It will be recalled that the Americans had been very cautious about widening the limits of eligibility during 1941.<sup>1</sup> Lend-lease supplies to Empire territories had been authorised only to the extent that the oil was used directly in support of the war effort. After America's own entry into the war a more liberal approach had been adopted. By September 1942 nearly all the oil imported into Empire territories from American sources was supplied under lend-lease.<sup>2</sup> In addition, from February 1942 the materials which the sterling oil companies needed to maintain their day-to-day operations, and which were obtainable only from the United States, also became eligible for lend-

<sup>1</sup> See pp. 196-197.

<sup>2</sup> South Africa, Central and East Africa and India required only lubricants from the United States, the rest of their supplies coming from sterling sources. Indian and South African lubricant supplies were authorised for lend-lease in February 1942. East African requirements never became eligible. Australia and New Zealand became heavily dependent on 'dollar' supplies after the loss of the East Indies; and they received most of these under lend-lease from the spring of 1942. The West African colonies also drew both lubricants and other oils from dollar sources; and these supplies were declared eligible for lend-lease in September and October 1942 after careful investigation of the uses for which they were required.

lease supply. The financial relief to the sterling area through these concessions was considerable; cash expenditure on materials and Empire supplies was nearly 24½ million dollars less in the second half of 1942 than in the first.

The autumn of 1942 proved to be, however, the high water mark of lend-lease eligibility, at least so far as oil was concerned. Afterwards American lend-lease officials became increasingly nervous about items which might give rise to controversy. They decided that cash payment would have to be obtained for all supplies required for purely civilian purposes in areas which were not a base for military operations. Then, in the spring of 1943, they declared all the African dependencies of Britain to be 'non-combat' areas. In November 1943, under the impact of the five Senators' report, they specifically excluded from lend-lease eligibility all equipment and materials required for expanding oil production and refining facilities which would have capital value after the war. This made no change whatever in practice because, contrary to the assertions of Senator Brewster, American equipment supplied for all the extensions underway at Abadan and Curaçao had been paid for in cash. In October 1941 the British had decided that it would be unwise to apply for this equipment under lend-lease, since this might provoke American criticism which could endanger concessions already won. But still another lend-lease curtailment, introduced in late 1943, had more practical relevance. This action reversed the February 1942 decision by declaring that equipment and materials required for day-to-day operations at sterling refineries would be in future ineligible for lend-lease assistance. Henceforward lend-lease only covered materials used directly by the Armed Forces.

The narrowing of the scope of lend-lease from 1943 onwards helped to send up the sterling area's dollar expenditure on oil supply. This expenditure had still been considerable even during 1941 and 1942. Apart from the cost of American equipment and materials for refinery expansion, cash had continued to be paid for small orders valued at 1,000 dollars or less, 'on orders for amendment or overruns on existing contracts' and on orders which needed to be met so quickly that it was preferable to avoid the lend-lease machinery (which happened mostly in connection with demands for special grades of lubricating oils). The refinery feedstock imported from Venezuela into Britain was also paid for in dollars because of the Americans disapproval of continued refining in Britain. Furthermore, sterling oil companies had to pay operating expenses (royalties, taxation, wages etc.) in the dollar area countries of South America; and there were of course the dollar remittances of American companies operating within the sterling area. Between the introduction of lend-lease and the end of 1942 the sterling area's net dollar bill

(i.e. outgoings, less earnings from sales to dollar countries) was \$212 million. From then on the rate of spending gradually rose. At the end of the war in Europe it was running at a rate of \$180 million a year, which was nearly as much as before lend-lease was introduced.

However the chief reason for the rise in net dollar expenditure on oil was not so much the narrowing of lend-lease eligibility, but the increasing scale of operations by sterling companies in dollar countries, and by dollar companies in the sterling area. Another factor was the decline in dollar earnings by sterling companies from sales to neutral countries. Sales for dollars in the Far East disappeared after Pearl Harbour; and earnings from South America fell away as arrangements for part-payments in other currencies came into force. Even more important was the growth of British Reciprocal Aid to the American Armed Forces, which reduced the surplus of oil available for sale.

Details of dollar expenditure by the sterling countries on oil are shown in Table 47. They were insignificant, however, compared with the vast and increasing scale of lend-lease supply. Down to the end of 1942, \$320 million worth of lend-lease oil was supplied to the

TABLE 47  
British Dollar Expenditure on Oil during the period of Lend-Lease Aid

	1941	1942	1943	1944	1945 January- September
\$ million					
<b>GROSS EXPENDITURE</b>					
<i>United Kingdom</i>					
Oil Purchases	83.2	15.2	17.6	10.0	14.8
American Dividends	1.2	3.6	4.4	4.8	0.2
<i>Rest of Sterling Area</i>					
Oil Purchases	84.8	53.2	23.2	35.6	26.0
American Profits, etc.	6.4	8.8	13.6	18.4	21.2
Purchase for sale outside sterling area	18.0	11.2	16.8	28.0	30.4
Purchases of Materials and Equipment	27.6	36.8	24.8	44.4	36.0
Running costs, etc.	24.4	20.0	27.2	35.2	46.8
<b>TOTAL</b>	<b>245.6</b>	<b>148.8</b>	<b>127.6</b>	<b>176.4</b>	<b>175.4</b>
<b>RECEIPTS</b>					
Sales of oil by sterling companies outside the sterling area	83.2	56.0	59.6	48.0	25.6
Other income of sterling companies including dividends	14.4	13.2	18.0	20.4	12.8
Lend-Lease recoveries	6.4	8.4	2.4	—	—
<b>TOTAL</b>	<b>104.0</b>	<b>77.6</b>	<b>80.0</b>	<b>68.4</b>	<b>38.4</b>
<b>NET EXPENDITURE</b>	<b>141.6</b>	<b>71.2</b>	<b>47.6</b>	<b>108.0</b>	<b>137.0</b>

sterling area, which was one-third more than its net dollar expenditure. By June 1945 nearly \$1,500 million worth of oil had been lend-leased to the United Kingdom alone. Over the last three months of the German war the rate of lend-lease supply reached \$750 million a year.

These large figures worried the American Administration. In 1944, with the Presidential elections approaching, Washington was even more sensitive than in 1942 and 1943 to the possibility of Congressional and public criticism. Much of the lend-lease oil was actually being consumed by American forces stationed in areas for which the British had provisioning responsibility. It could be argued that the figures were thereby being misleadingly inflated. Even more objectionable from the American point of view was the fact that, under the procurement arrangements set up in 1941, American oil shipped to Britain for American consumption passed into British title. The American Services then drew on these British-owned stocks, the transfer counting as Reciprocal Aid.

In August 1944, therefore, Washington put forward proposals designed to remove from British title most of the oil destined for American forces consumption. This would give the figures of Lend-Lease and Reciprocal Aid a greater correspondence with reality. At the same time it would make it impossible for the British to buttress, (or to be accused of buttressing) their post-war position by accumulating large stocks of oil at American expense. Briefly, the Americans proposed that 'dollar' oil supplied to Britain should be shipped in American title, and only be formally 'lend-leased' on arrival; and that aviation spirit and motor fuel, the two products most heavily consumed by Americans in Britain, should not be lend-leased at all except to the extent that supplies were actually consumed by the British. They also proposed that the oil stocks held in Britain should be divided into two parts: a 'United States military share' and a 'lend-lease share'. The 'United States military share', was to be calculated through a formula based on the proportion 'which imports programmed for United States military use during a selected base period bear to total imports of dollar oil for that period', plus or minus the difference between subsequent imports programmed for American use and actual American consumption. This share was to be liable to withdrawal by the Americans at any time. The Americans also suggested that the oil which had been lend-leased to the British but subsequently consumed by the American forces should simply be deducted from the figure of lend-lease supply, instead of being charged to inflate the figure of Reciprocal Aid.

The British reaction was mixed. They disliked the suggestion that all dollar oil should be shipped to Britain in American title. A change in the machinery of procurement, they feared, might ultimately lead

to the infringement of London's provisioning responsibility for the United Kingdom—and this fear was not without cause as the Munitions Assignments Committee (Navy) was to demonstrate later that autumn.<sup>1</sup> There was also, as the Treasury pointed out, the chance that this new proposal for oil might be used as a precedent for other commodities supplied to this country under lend-lease. But the British could raise no objection in principle to the other parts of the American proposal. Discussions with the American mission headed by Rear Admiral Carter and Brigadier-General Peckham ended in an Agreement by which the British successfully preserved shipment of lend-lease oil in British title. But the Americans were conceded the right to withdraw their 'military share' of United Kingdom stocks 'subject only to such administrative regulations as His Majesty's Government may consider necessary to prevent serious interference with storage and movement of material for essential military and civil operations'. The agreement also provided for deflating the figures of Lend-Lease and Reciprocal Aid by modifying the accounting procedure in the way suggested by the Americans.

This agreement was ratified by the Combined Chiefs of Staff in October 1944. However, because of the time it took to work out the detailed formula for division, arrangements for dividing up the United Kingdom stocks did not come into effect until after the end of the war. The Americans did not then withdraw the 'military share' *in toto*. Instead, during late 1945 and 1946 their Forces in Europe were supplied with an amount of oil equal to that share, partly from United Kingdom stocks and partly from sterling sources overseas.

## (ii)

### Retrospect

Between September 1939 and May 1945 the oil authorities in London were responsible for supplying more than 86 million tons of mineral oil to Britain and the S.H.A.E.F. area in Europe. Of this, less than 6 per cent. was provided by exploiting materials indigenous to this country; even so the oil thus obtained amounted to more than twice the pre-war annual average output. Programmes to produce petroleum substitutes at home in order to save tanker space were fostered from the early months of the war, following the appointment of the Bragg Committees. In adopting these programmes the Government was acting contrary to the tenor of the pre-war Falmouth report,

which had argued that using substitute fuels would make a disproportionate demand on domestic resources. The burning of creosote-pitch mixture in place of imported fuel oil for example called for a not inconsiderable expenditure of manpower and materials in carrying out plant conversion programmes; and in the later years of the war manpower and materials were much more scarce than tanker space. Some programmes—for instance the 'producer gas' programme—were embarked on only hesitantly and after long debate. Public expectation may well have been the factor which tipped the scales. There had been in Britain between the wars a wide awareness of the possibilities of oil substitution owing to the difficulties of the domestic coal industry—and the publicised achievements of the Germans with substitute programmes. At a time when restrictions were being placed on the private consumption of oil in Britain, the Government was therefore under some pressure to demonstrate that it had not overlooked any oil possibilities, including the exploitation of indigenous materials for substitute fuel. Yet a more rigorous scrutiny of the balance of advantage when substitution programmes were being considered might have led to decisions against import-savings on a petty scale. This happened in the case of those home refineries which were kept going at a small cost in tanker space, and in the face of many outside pressures.

But home production was a minor matter. The overwhelming proportion of Britain's war-time supplies was imported. Here the oil authorities were not masters of events. The stock fall in the opening months of the war was a result of transitional circumstances which might have been better anticipated but could hardly have been avoided. The oil authorities were not responsible for the consequences that flowed from the collapse of France; but they were quick to deal with the port congestion that held up imports in late 1940. In the months that followed tanker arrivals were governed mainly by the state of the war at sea, picking up in the spring of 1941 when the U-boats were driven away from the Atlantic shipping lanes. Early in 1941 the oil authorities asked themselves whether they should not have switched tankers from the Eastern supply routes earlier than they did; and indeed it could be charged that in every winter of the war the oil authorities waited until United Kingdom stocks began to fall, instead of acting in advance to reinforce the tankers supplying this country. But this charge is somewhat too facile. Between the summer stock peaks and the winter stock troughs, there was always vital work for tankers in building up supplies elsewhere in the world; and there was a limit to the celerity with which these tankers could be switched out of the United Kingdom supply programme and back into it again.

After 1941 United Kingdom oil imports had to come increasingly

<sup>1</sup> See p. 426 *et seq.*

from the United States because of the requirements of the 'short-haul' policy: and the British became more and more dependent on American tankers. Relations with America thus became the key factor in determining how much oil Britain could import. It is, therefore, on the skill with which they dealt with their opposite numbers in Washington that the British oil authorities must be primarily judged.

At the heart of the Anglo-American relationship lay competition between the British authorities and the United States Armed Forces for two scarce commodities: 100-octane spirit and tanker space. Incipient clashes over aviation spirit early in 1942 led to the setting up of formal allocation machinery. Through the greater part of that year, however, conflict over tanker tonnage was avoided. The large American civil tanker fleet working in western hemisphere trades was a reserve into which both parties were able to dig deeply. This was the time when the British authorities reaped their reward for the excellent relationship they had developed with the United States Office of Petroleum Co-ordinator before Pearl Harbour. By virtue of its control over supplies to civilian markets in North and South America that Office was in a position to free a large amount of tonnage for British service—and also, of course, for the supply of *Torch* which, directly and indirectly, absorbed a substantial part of the Red Gap and Blue Gap aid furnished by the Americans in 1942.

Conflict between British claims and those of the American military came out into the open over the allocation of aviation spirit late in 1942. Less dramatic but equally hard fought was the struggle for the services of new American 'Greyhound' tankers in 1943; on the British side this found expression in the efforts of Mr. Wilkinson in Washington to persuade the Americans to build up the CU convoy system. But it was in 1944 that the clash between the rival claimants reached its apogee. The resentment and disquiet about British oil policy that was stirred up in the United States in late 1943 and early 1944 has been previously mentioned. But even without these political overtones there must have been friction, for there were deep divisions on war strategy between London and influential people in Washington. The Combined Chiefs of Staff had ruled that the European war should take priority over the war in the Pacific. But there were members of the United States Chiefs of Staff organisation whose instinct was to press the Pacific campaign as fast and as far as could be managed without restricting operations in Europe. These members saw the successful landings in Normandy and the failure of the Germans to react effectively as creating a new situation. No longer was there any serious danger that the flow of supplies across the Atlantic would be interrupted by enemy action. Faced with mount-

ing oil demands in the Pacific these Americans became disturbed at what they regarded as London's failure to take full cognizance of this change in circumstances. The reduction of the United Kingdom's stock target by half a million tons was viewed by these Americans as an inadequate response. Nor, when they came to look at it, could they see how the original stock target (now reduced) had been arrived at. They came to the conclusion that the target was a purely arbitrary figure, 'picked out of the air' as Mr. Wilkinson reported. From this conclusion there followed a feeling that British judgment of United Kingdom stock needs was not to be trusted. Indeed some Americans saw more than bad judgment. They suspected that the British were less concerned with the immediate prosecution of the war than with improving their post-war position by accumulating oil stocks at American expense.

The British, for their part, were more deeply committed to the view that the German war should take priority. They felt that nothing should be allowed to imperil the success of operations in Europe. They saw such a peril in allowing United Kingdom oil stocks to fall below their 'distributional minimum'. Specifically they were indignant that oil consumption for the Pacific war—a secondary front in the British view—should be put on a par with stockbuilding requirements in the United Kingdom.

This line of thinking would have led them to reject all claims from the Pacific which threatened to reduce oil stocks in Britain to 'danger level', however well-founded they thought them to be. But in fact, during the final twelve months, the British were highly sceptical of the validity of the requirements figures coming out of that war theatre. As Mr. Wilkinson put it roundly in February 1945 they had 'no faith' in American statements of the oil position there. Experience of over-sanguine American Service estimates in Britain and elsewhere accounted for some of their distrust. At the same time they doubted whether tankers were being used in the Pacific to the best advantage. They saw no reason to believe that American officers in the Pacific would do better than British and American officers had done in the West Mediterranean, the other main 'United States-provisioned' war theatre, where gross tanker mismanagement had come to light late in 1943.<sup>1</sup> Behind this distrust lay resentment accumulated during the years when the Pacific theatre had been run as a kind of secret and privileged preserve of the United States Services. 'We hope', ran a cable from London in January 1944 'that the United States authorities will be prepared to include even the Pacific . . . in their search for extra tankers'. 'We are perpetually being told', said another cable in June 1944 'that we must do without

<sup>1</sup> See p. 404.



this or that because of the position in the Pacific, about which we have practically no information.'

An exacerbating factor in relations was the great and increasing disparity in resources between the two 'equal' partners. This was a factor which, it will be remembered, had put a strain on relations between British and French in the early months of the war. Like the British in 1939-40 the Americans were always in a position to call the tune when they chose. Just as, in the past, the French had depended on British supplies, so the British now depended on America to fill the gap between what they required and what they could produce themselves. Against this the most the British could do for the Americans was to save them from some marginal inconvenience by filling a local deficiency or two.

Conscious of the inferiority of their resources the British adopted a defensive posture. They were jealous of their rights as an equal partner and careful to preserve their authority even at the cost of administrative inconvenience; thus, for instance, in the spring of 1943 they refused, despite heavy American pressure, to allow the allocation of sterling aviation spirit produced in the Caribbean to be transferred to Washington. They were wary of all American proposals and ready to suspect ulterior motives, particularly where the United States Armed Forces were concerned. This distrust coloured London's whole approach to the question of allocation. For it was the United States Service Departments which were responsible for provisioning theatres within Washington's supply orbit. In British eyes this gave those theatres, and especially the Pacific, an advantage they did not deserve in the competition for American-produced resources. After the middle of 1943 the British felt that they continually had to make special efforts to secure their due share.

For their part the United States Chiefs of Staff hinted on at least one occasion that their influence in Allied counsels should reflect the weight of their 'overwhelming contribution'. They pointed out in July 1944 that more than 88 per cent. of the aviation spirit and 75 per cent. of the petrol supplied to Britain during the previous twelve months had come from 'dollar' refineries and that over 70 per cent. of the carrying capacity of the Allied tanker fleet came from American-built vessels. To quote figures of shipments to Britain in isolation was misleading and the inference drawn was illogical. But the feeling expressed was understandable and human.

It is hard to avoid the conclusion that the British were too cautious in their approach to the United Kingdom stock question. They would have done better to have lowered their stock target long before January 1945 and thus, perhaps, have forestalled American resentment. On the other hand the Americans were rather too theoretical

in calling for stocks in this country to be held at a level that left no margin for contingencies and was strictly related at all times to consumption. For one thing United Kingdom oil stocks moved up and down regularly on a seasonal basis—reflecting seasonal variations in tanker carrying capacity. In every summer of the war except that of 1942 stocks were built up to see the country through the lean winter months; and in every winter of the war except that of 1941-42 the authorities in Britain saw the seasonal decline in stocks proceed faster and farther than expected owing to unforeseen developments. The critical members of the United States Chiefs of Staff organisation gave less than its due weight to this British experience; and in suspecting British motives they perhaps too lightly considered the economic price the British themselves had paid for their stockbuilding policy (particularly in terms of investment in storage capacity and pressure on transport facilities).

But to leave this description of Anglo-American war collaboration as an account simply of the differences between the two Allies would be to give a grossly distorted picture of realities. An important point to be borne in mind is that differences of view over theatre allocations did not run purely along national lines. There were large British forces in American theatres such as the West Mediterranean, and large American forces in British theatres, notably, of course in the United Kingdom itself. British and Americans tended to stand together within theatres when their common requirements were in question. Furthermore there was a lot more 'give' on the British side, than their rigid and conservative stock policy suggests. London always took the view that United Kingdom stocks, because they were so much larger, relatively, than those of other theatres, should be treated as a kind of 'world reserve' when tonnage was really short. In the later months of 1943 and 1944 they gave a practical demonstration of this when they withdrew British-controlled tankers from the United Kingdom supply programme and sent them to assist American programmes.

One question remains to be considered. Was the crucial British decision, taken on the morrow of Pearl Harbour, to avoid the setting up of formal combined machinery and to rely instead on informal contacts, through their oil and tanker mission in Washington, justified by results? Would relations have been smoother or would the British have fared better if the other road had been taken?

It is arguable that the British did indeed suffer to some extent from the absence of formal machinery. A high level Combined Oil Board might have been able to extract fuller information at an earlier date from the American Services. The existence of such a board might have prevented the attempt of the United States Chiefs of Staff organisation to impose allocation decisions on the executive agencies

through the Combined Munitions Assignments Board. A Combined Oil Board would probably have provoked less hostility in Service quarters than the arrangement adopted which, as Mr. Wilkinson confessed, had something of the nature of an exclusive club for 'the few of us dominating the oil situation'. A formal body would certainly have found it easier to resist attack. In March 1945, at the end of the 'assignments controversy', Mr. Wilkinson himself raised the question whether, if the European war went on much longer, the British would be well advised to 'take out insurance in the form of establishing a more orthodox combined machinery . . . to fend off . . . further troubles'. On the other hand the ability of an international body to function effectively in the face of divergencies of national interest is more than doubtful. A case in point is provided by the fate of the Oil Control Board and its Executive Committee which were joined by American members after Pearl Harbour. In the final two years of the war these two committees fell into desuetude. They could no longer discuss questions of oil requirements and stock policy since these were questions which divided the Allies. On two occasions in 1943 the Board held special meetings to which its American members were not convoked.<sup>1</sup> In the later years of the war stock policy had to be discussed outside the Board machinery in a panel of representatives of the Petroleum Department, the Ministry of War Transport and the Service departments, and their recommendations were fed into the Combined Chiefs of Staff machinery by way of the British Chiefs of Staff and their Principal Administrative Officers Committee.

It is unlikely that a Combined Oil Board would have fared better than the Oil Control Board when that body had a 'combined' membership. Nor would the creation of such a board have necessarily made it easier to secure American oil supplies. Mr. Wilkinson himself considered this question and answered 'unhesitatingly and with complete conviction' in the negative. 'We never could have got the results . . .' he wrote to the Petroleum Department, 'if we had worked through the rather shackling methods of complete orthodoxy with its combined secretariat, its formal meetings, minutes, etc.'. This opinion may, to some extent, reflect the impatience of a particular personality with the formalities of Civil Service procedure. But the man who gave it was the linchpin of Anglo-American oil collaboration between 1942 and 1945, and his opinion is not to be lightly challenged. Certain it is that the British had little to complain about in the attitude of the American executive agencies towards British supply problems during those years. Mr. Wilkinson's appointment in

1942 to the post of British Petroleum Representative had been warmly welcomed by the Americans, and his relations with the United States Petroleum Administration for War were close and comradely from the start. Later, in the face of pressure from the Pacific, it was the efforts of Rear Admiral Carter of the United States Army-Navy Petroleum Board which were largely responsible for the expansion of the CU system of 'Greyhound' convoys to Britain in the autumn of 1943. It was Rear Admiral Carter and his staff who led American opposition, at the end of 1944, to making oil products subject to allocation by the Combined Munitions Assignments Committee (Navy), and who smoothed the way to the stock agreement at Yalta in 1945.

In describing relations between British and French during the first nine months of the war it was remarked that this partnership was handicapped by lack of pre-war contact, and that the elaborate formal machinery set up after the war started was probably valuable as a forcing house for habits of co-operation even though it did not work very well in the beginning. The oil collaboration between Britain and the United States developed in an entirely different way. It was founded on technical expertise and working relationships within the oil industry which long preceded the war-time alliance between governments. Leading officials on both sides of the Atlantic were recruited from the oil companies for war service. Sometimes these British and American officials had worked for the same company and known one another for years. British or American, in or out of uniform, these oilmen formed a fraternity of their own—a 'club' as Mr. Wilkinson called it, which tended to stand solidly together against 'the evil intentions of three-ring Admirals and the like'.

There can be no doubt that this sense of solidarity within the international oil community was a very strong card in the hands of the outweighed British. They relied on that card and played it skilfully. From it, in the final analysis, they drew the strength to hold their own.

<sup>1</sup> One was to discuss the American proposal to set up a Combined Petroleum Board. The other was to discuss a proposal for conversations on Middle East oil.

APPENDIX VI  
Calendar Year War Statistics

TABLE 48  
*Production at Sterling Refineries 1939-44*

000 tons

	Curaçao, Trinidad Arend		United Kingdom*		Middle East†		South and South- East Asia‡	
	White Pro- ducts	Black§ Pro- ducts	White Pro- ducts	Black§ Pro- ducts	White Pro- ducts	Black§ Pro- ducts	White   Pro- ducts	Black§ Pro- ducts
1939	1,909	8,330	647	1,285	2,914	6,183	2,516	2,955
1940	1,589	8,489	544	862	2,253	6,944	4,417¶	3,796¶
1941	1,791	9,035	373	560	2,202	5,825	2,902¶	2,785¶
1942	1,735	7,743	520	508	3,421	8,097	192	77
1943	2,168	8,714	444	526	4,141	8,798	203	83
1944	2,539	10,148**	638	584	5,244	11,620	181	99

\* Refinery production from imported feedstock, indigenous petroleum and shale and the hydrogenation of creosote.

† Excluding output at the American-owned refinery of Bahrain.

‡ East Indies, Burma and India.

§ Includes lubricating oil but not bitumen. Refinery fuel is included at some refineries.

|| Includes jute batching oil.

¶ Includes production at American-owned refineries probably accounting for under 30 per cent. of total.

\*\* Excludes 451,000 tons of light southern fuel transferred to the United Kingdom for further processing.

TABLE 49

Indigenous Mineral Oil Output in the United Kingdom 1938-45

000 tons

	Crude Oil		Refined Products					Low temp. carb.
	Crude Petroleum	Shale Oil	Total	From Crude and Shale Oil*	From Coal Tar Oils			
					Benzole	Creosote, c/p mixture	Hydrogenation	
1938	—	125	517	109	215	50†	141	2
1940	17	126	660	123	228	158	145	6
1941	30	131	784	133	210	327	110	4
1942	82	149	950	149	190	510	96	5
1943	113	145	1,046	187	193	574	86	6
1944	95	134	1,057	165	217	544	126	5
1945	72	116	997	136	240	503	113	5

\* Excluding bitumen and other solid products.

† 'Normal' consumption.

TABLE 50

Production of Coal Tar Products in the United Kingdom 1942-45

000 tons

Product	1942	1943	1944	1945
Crude tar distilled*	2,172	2,124	2,083	2,121
Road tar (including refined tar)	640	650	606	628
Creosote-pitch mixture	530	624	591	559
Creosote oil	64,000§	49,000§	55,000§	60,000§
Pitch	467	380	404	412
Other products†	41	44	42	42
Other products‡	6,333§	7,379§	7,188§	7,122§

\* The quantity distilled in 1938 was approximately 2,040,000 tons.

† White naphthalene, hot-pressed naphthalene, crude naphthalene, natural phenol and anthracene 40/50 per cent.

‡ Pyridine bases and refined cresylic acid (all grades).

§ 000 gallons.

TABLE 51

United Kingdom Petroleum Imports 1938-45

000 tons

Products	1938	1940	1941	1942	1943	1944	1945
Aviation Spirit	} 4,699	632	819	1,012	2,090	4,751	1,934
Motor Spirit		2,920	3,939	3,081	3,236	4,773	4,912
White Spirit	65	63	58	107	69	111	98
Burning Oil	} 748	885	687	337	542	607	661
Vaporising Oil		108	381	519	671	764	567
Gas/Diesel Oils	} 2,998	1,373	1,793	1,364	1,886	2,211	2,066
Fuel Oil		1,193	1,445	633	1,700	1,425	1,440
Admiralty Oil Fuel	403	1,991	2,449	1,773	3,367	3,912	2,240
Lubricating Oils	433	578	491	565	436	572	336
Crude and Process Oils	2,272	1,528	1,066	867	798	1,218	1,363
Total	11,618	11,271	13,128	10,258	14,795	20,344	15,617

TABLE 52

United Kingdom Petroleum Consumption 1938-45

000 tons

Products	1938	1940	1941	1942	1943	1944	1945
Aviation Spirit	113	404	711	1,141	2,052	4,782	2,547
Motor Fuel*	5,218	3,764	4,130	3,640	3,411	4,164	3,898
Paraffin	721	872	943	1,012	1,067	1,134	1,263
Gas/Diesel Fuel Oils							
Inland†	1,608	1,572	1,553	1,414	1,241	1,413	1,367
Bunkers Civil	1,425	1,249	1,041	1,436	1,459	1,135	2,065
Naval	403	2,596	2,089	2,203	2,478	4,164	2,661
Bitumen	607	380	348	248	177	263	243
Lubricating Oil	560	517	647	628	592	699	553
Total‡	10,765	11,483	11,611	11,882	12,628	18,912	14,768

\* Motor spirit and derv fuel.

† Excluding derv fuel.

‡ Including white spirit and industrial spirits not included under products.

TABLE 53  
Motor Spirit and Derv Fuel: Deliveries within the United Kingdom 1939-45

		000 tons						
		1938	1940	1941	1942	1943	1944	1945
<i>Great Britain</i>								
Private Motoring:								
Basic Rations	MS		382	355	120	—	—	220
Supp. Allowances	MS		437	406	337	274	302	397
	T	2,350	819	761	457	274	302	617
Goods Vehicles	MS	1,425	1,228	1,285	1,171	1,065	1,075	1,212
	D	85	99	105	107	84	98	99
	T	1,510	1,327	1,390	1,278	1,149	1,173	1,311
Public Service Vehicles	MS	440	179	217	211	186	180	200
	D	290	314	337	337	329	342	382
	T	730	493	554	548	515	522	582
Taxicabs	MS	100	41	41	44	43	46	60
Agriculture	MS	70	103	105	99	95	110	135
	D	—	—	—	—	—	—	—
	T	70	103	105	99	95	110	135
Industrial (a)	MS	160	210	196	160	127	134	140
	D	—	—	2	3	3	3	2
	T	160	210	198	163	130	137	142
Government Departments	MS	(b)	67	82	80	79	89	92
	D	(b)	—	1	1	1	1	1
	T	(b)	67	83	81	80	90	93
Local Authorities	MS	135(c)	111	121	110	108	114	93
	D	1(c)	5	1	1	1	1	1
	T	136(c)	116	122	111	109	115	94
Police	MS	(b)	14	13	10	9	10	11
Total Civil	MS	4,680	2,772	2,821	2,342	1,986	2,060	2,560
	D	376	418	446	449	418	445	485
	T	5,056	3,190	3,267	2,791	2,404	2,505	3,045
<i>Northern Ireland Civil</i>	MS	96	56	68	67	58	57	66
	D	8	4	4	5	4	4	5
	T	104	60	72	72	62	61	71
<i>United Kingdom Services</i>	MS	38	387	653	658	820	1,416	645
	D	1	4	13	17	27	46	16
	T	39	391	666	675	847	1,462	661
Dealers' Allowances, etc.	MS	17	120	121	100	95	132	116
	D	2	3	4	2	3	4	5
	T	19	123	125	102	98	136	121
Total United Kingdom Deliveries	MS	4,831	3,335	3,663	3,167	2,959	3,665	3,387
	D	387	429	467	473	452	499	511
	T	5,218	3,764	4,130	3,640	3,411	4,164	3,898

(a) Includes trade plates, showmen's vehicles and ambulances.

(b) Included in figures given against local authorities.

(c) See (b).

Key: MS=Motor Spirit

D =Derv Fuel

T =Total

TABLE 54  
Paraffin: Deliveries within the United Kingdom 1938-45

		000 tons						
		1938	1940	1941	1942	1943	1944	1945
<i>Aviation Turbine Fuel</i>								
Civil		—	—	—	1	3	7	15
Services		—	—	—	—	—	1	11
Total		—	—	—	1	3	8	26
<i>Other Burning Oil</i>								
Domestic*		390	413	369	318	280	305	331
Industrial†		90	120	105	90	80	80	80
Farming		45	40	40	40	40	40	40
Railways‡		18	15	17	18	18	19	19
Services		—	25	27	36	29	55	29
Total		543	613	558	502	447	499	499
<i>Vaporising Oil</i>								
Agricultural Tractors		150	230	352	474	579	588	695
Agricultural Stationary		—	—	—	—	—	—	—
Engines		8	10	11	12	12	12	15
Industrial§		5	8	10	12	14	16	16
Fishing		15	8	8	8	8	8	10
Services		—	3	4	3	4	3	2
Total		178	259	385	509	617	627	738
Grand Total		721	872	943	1,012	1,067	1,134	1,263

\* Heating, lighting and cooking.

† Including local authorities.

‡ Including Government.

§ Including railways.

TABLE 55

Gas, Diesel and Fuel Oil: Deliveries within the United Kingdom 1938-45

000 tons

	1938	1940	1941	1942	1943	1944	1945
<b>Petroleum</b>							
<i>Burning:</i>							
Central Heating:							
Private Houses	20	} 180	9	7	5	5	6
Other	225		147	115	72	64	64
Bakeries	65	} 125	52	51	50	50	51
Glass	91		42	36	30	27	29
Ceramics	(a)	(a)	5	4	2	2	2
Steel Manufacture:							
Open Hearth	—	} 345	} 125	116	83	53	50
Other	—			144	153	115	65
Industrial Furnaces:	325						
Metallurgical	—						
Other	55						
Steam Raising and Other							
Furnaces	103	80	64	48	31	29	31
Agricultural Driers and Heaters	(b)	(b)	2	2	2	2	3
Total	884	730	627	565	414	316	308
<i>Power:</i>							
Agricultural Power Units	6	10	10	15	18	18	21
Marine Craft	65	47	48	47	50	51	64
Rail Traction	7	6	7	6	7	9	8
Stationary Oil Engines:							
Public Electricity	17	} 214	17	14	11	12	15
Other	196		198	182	174	172	153
Mobile Diesel Engines	43	63	64	63	67	77	80
Total	334	340	344	327	327	339	341
<i>Manufacture, etc.:</i>							
Gas-making	130	165	197	201	224	378	430
Other manufacture	32	41	26	22	30	36	30
Petroleum Industry's own use	35	55	68	68	39	58	38
Government	10	66	124	96	108	99	70
Refinery Fuel	183	175	167	135	99	187	150
Total	390	502	582	522	500	758	718
Grand Total of above	1,608	1,572	1,553	1,414	1,241	1,413	1,367
<i>Creosote and Creosote-Pitch (c)</i>							
<i>Burning</i>	—	160	308	454	548	535	590

- (a) Included under Other Manufacture.  
 (b) Included under Agricultural Power Units.  
 (c) Marketed by the Petroleum Board.

TABLE 56

Aviation Spirit: Deliveries within the United Kingdom 1938-45

000 tons

	Total	Armed Forces*	Engine Manufacturers	Civil Airlines†
1938	113	70	22	21
1940	404	355	46	3
1941	711	631	78	2
1942	1,141	1,013	126	2
1943	2,052	1,891	159	2
1944	4,782	4,604	175	3
1945	2,547	2,426	112	9

\* Including Allied forces.

† Including charter companies, clubs, schools etc.

TABLE 57

Bitumen: Deliveries within the United Kingdom 1938-45

000 tons

	Total	Roads* and Airfields	Building† Materials	Electrical Equipment	Proofing‡	Paint§ etc.	Other Uses
1938	607	432	111	25	11	16	12
1940	380	193	130	15	12	19	11
1941	348	165	115	15	12	25	16
1942	248	121	63	18	7	25	14
1943	177	103	26	15	7	12	14
1944	263	139	24	14	26	8	52
1945	243	134	49	16	20	9	15

\* Construction and maintenance.

† Roofing, floors and building compounds.

‡ Proofing of fabrics and paper.

§ Paint, lubricants and pipe compounds.

TABLE 58  
United Nations Tanker Tonnage by Flag 1942-45\*

	August 1942†		May 1943†		May 1944†		May 1945†	
	No.	000 d.w. tons	No.	000 d.w. tons	No.	000 d.w. tons	No.	000 d.w. tons
United States flag	354	4,268	412	5,319	662	9,099	890	12,875
British flag‡	372	3,784	354	3,609	377	3,877	392	3,991
Norwegian flag	165	2,059	147	1,835	137	1,728	156	1,988
Dutch flag	70	334	69	457	69	476	66	457
Panamanian flag	67	827	65	758	67	765	69	796
Other flags§	91	862	89	726	117	948	113	918

\* Allied tankers and neutral tankers (of 1,600 gross tons and over) outside enemy control or influence, excluding Great Lakes tonnage.

† At end of month.

‡ Includes tankers on the register of other Empire countries.

§ Including Russian and Latin American tonnage, and Swedish tankers outside the Baltic. Portuguese, Spanish and Turkish tonnage is not included.

TABLE 59  
Tanker Tonnage Losses by Flag 1942-45\*  
(1,600 gross tons and over)

	000 d.w. tons					
	British	American	Norwegian	Dutch	Panamanian	Other
Sept. 1939-41	1,469	30	430	51	63	80
1942	924	976	588	171	279	81
1943	310	262	246	10	106	41
1944	94	140	22	6	5	26
1945	91	13	13	13	—	—
War Total	2,888	1,421	1,299	251	453	228

\* Including Navy-owned tankers, whalers etc., and taking account of marine as well as war losses. The figures for 1939-41 include losses of neutral tonnage sailing in Allied and neutral trades.

TABLE 60  
Tanker Construction by Flag 1942-45\*  
(Completions)

	000 d.w. tons				
	United Kingdom		United States		Canada
	'Greyhounds'	'Non-Greyhounds'	'Greyhounds'	'Non-Greyhounds'	'Non-Greyhounds'
Sept. 1939-41	—	478	257†	137†	—
1942	—	457	909	90	11
1943	—	295	2,795	616‡	40
1944	106	148	3,971	54‡	101
1945 (Jan.-May)	41	46	1,609	—	—
War Total	147	1,424	9,541	897	152

\* Vessels of 1,600 gross tons and over. Includes ocean tankers built for the Royal Navy and the United States Navy.

† Completions during 1941 only.

‡ 'Emergency tankers', which were modifications of non-tanker 'Liberty' types.

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