

THE SHELL
THAT HIT GERMANY
HARDEST

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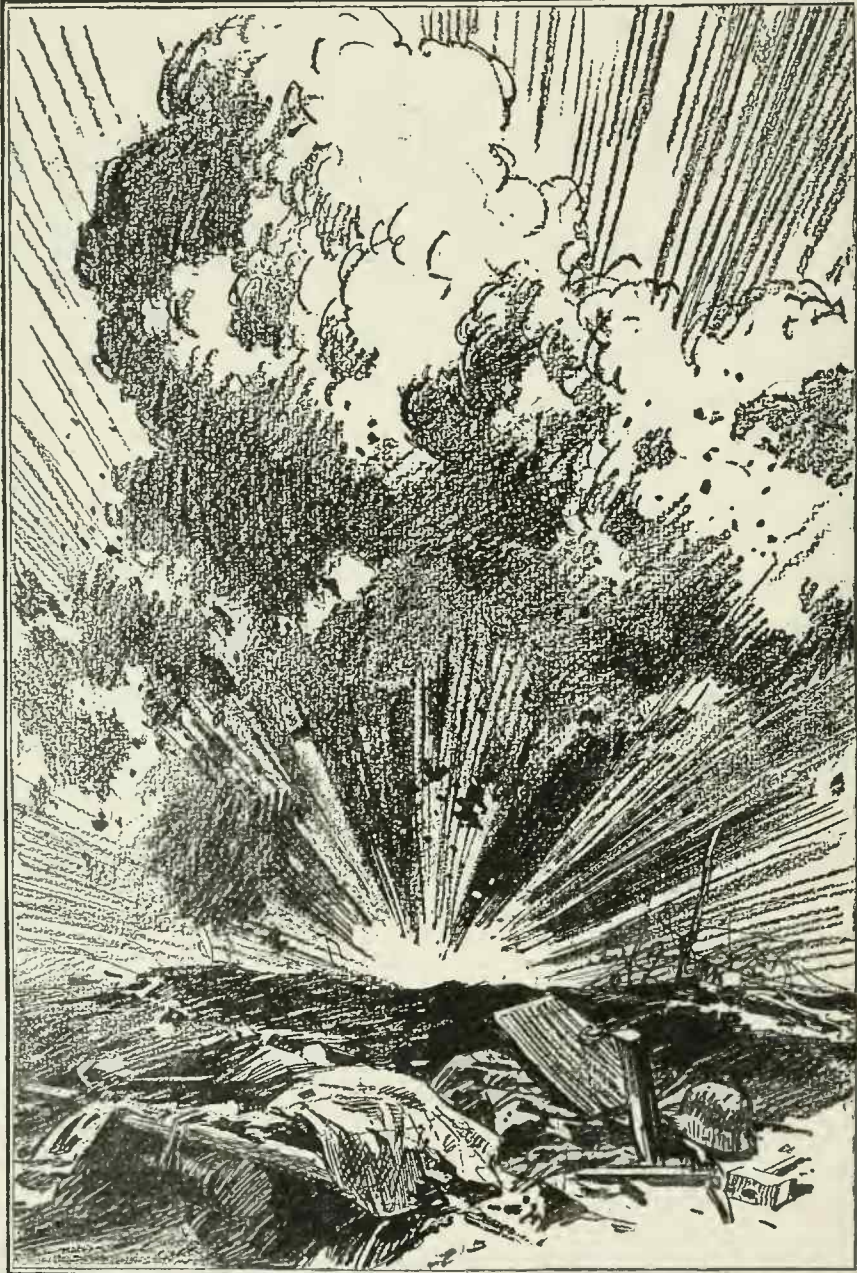
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Admiral Sir David Beatty

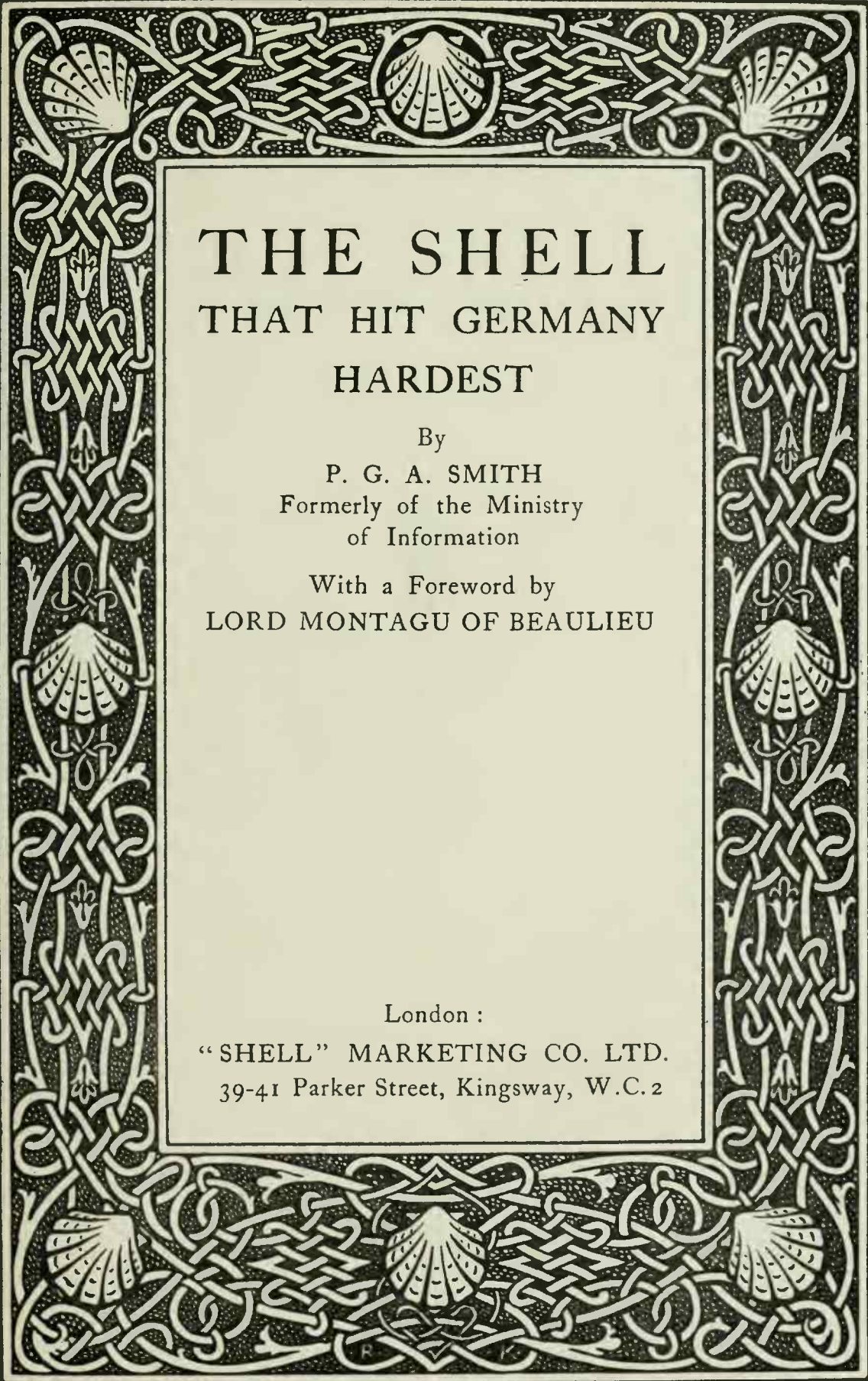
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39-41 Parker Street
Kingsway, London, W.C. 2

THE SHELL
THAT HIT GERMANY
HARDEST



“ Without toluol and without petrol and oil fuel supplied by the SHELL organisation, the Allies could not have beaten the Germans.”—*Financial News*.



THE SHELL
THAT HIT GERMANY
HARDEST

By
P. G. A. SMITH
Formerly of the Ministry
of Information

With a Foreword by
LORD MONTAGU OF BEAULIEU

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Foreword

By LORD MONTAGU OF BEAULIEU



THE future of civilised life both in peace and war is going to depend more and more upon the practical application of science to men's everyday needs. The two branches of science most needful for this are chemistry and mechanics. And in this evolution, oil and its products are going to play an ever-increasing part.

Take locomotives as an instance. Up to 1840—only 80 years ago—animal-drawn vehicles were the only means of fast (12 m.p.h.)—as it was considered then—progression. Then came railways, and with railways came the coal and steam age, which lasted unbroken until about 1890, when oil and gas in various forms began to make inroads upon the until then unchallenged position of coal and steam combined as the only prime mover.

And it is interesting to reflect that if it were not for the discovery and use of oil and oil products, probably at least one quarter of the machinery to-day producing power would be using coal instead of these forms of power production, and the national output of coal, especially at its now reduced figure, would be unable to sustain the burden, with the result that coal would now be costing over £5 a ton, with all the evils attendant upon such high prices.

Coal has now a serious rival in oil, and in my opinion during the next 20 or 30 years the declining monopoly of coal as our only large source of power will be further shattered by the use of oil. And though I am not discussing national politics or economics, I would say that the power of those who own, produce, transport and

sell coal, over the rest of the community, will be thus gradually reduced.

Oil and water, two forms of "white coal," are already in many places the consumer's remedy against high prices of coal, and it is interesting to observe in the development of the world that nature, if you look into her secrets deeply enough, will always give you some alternative method of producing what humanity is in need of.

Now, just a word as to the War, I can speak from personal knowledge of the magnificent effort made by the SHELL Company in producing high explosives and motive power. With special feeling also do I realise—after my own experiences—the enterprise of the Company, and the bravery of those in charge of its fleet, when I look at the list of the vessels of the SHELL fleet which were torpedoed or mined during the War. And I can tell the public who read these words that the Germans were keener on sinking vessels conveying oil than on any other ships that sailed the ocean. They realised at the very beginning of the War that the liquid fuel supply was vital to our sea supremacy then, and to our air supremacy later. Without liquid fuel you cannot fly, you cannot use submarines (at least until lately), and you cannot run the mechanical transport service of your Army on land.

Now that peace has come, petroleum products are more than ever necessary for road, sea, and air transport, which will shortly increase to a considerable extent over pre-war figures.

National disaster was averted by the adequate supplies of liquid fuel, and national prosperity may now be largely assisted by its use.

MONTAGU.

High Explosives

“Without Toluol . . . the War would have been lost.”

(M. Bérenger, Commissioner-General of Petroleum in France).



It may review almost any of the great crises of the European War, and see in the light of subsequent events where victory would unquestionably have been with the enemy had not wisdom dictated our course. Of no crisis was this more obviously true than in that of the sensational shortage of high explosive shells, which led to so determined an agitation by a section of the Press, and filled with apprehension every country of the Entente. A secret page of war history, made public by the *Petroleum Review* shortly after the armistice, reveals the highly-important part taken by SHELL in averting catastrophe. A brief extract from the article follows :—

“ . . . It will doubtless come as a surprise to many to learn that it was in consequence of special petroleum products being able to fill such a vital rôle with success that the Allied victory was assured.

“M. Bérenger, the Commissioner-General of Petroleum in France, at the Government dinner at Lancaster House . . . laid particular stress upon the invaluable international assistance which had been rendered by Mr. H. W. A. Deterding and the SHELL group of interests in connection with the supply of toluol to the various Allied Governments for high explosive

purposes, without which, he asserted, *the war could not possibly have been won by the Allies.*

“Following upon M. Bérenger’s announcement, it is now permissible to lift the veil of secrecy in regard to the highly-important work which has been carried out by the SHELL group in connection with the supply of toluol to the Allied Governments, and to give publicity to a few facts which, during the course of the European War, have been kept particularly secret.

“As far back as May, 1915, the shareholders of the SHELL Transport and Trading Company, Limited, were informed that their chairman—Sir Marcus Samuel, Bart.—had received a letter from the Lords Commissioners of the Admiralty giving expression to their appreciation of the war services which had been rendered by their company. Now, for the first time, it can be made known that those services were in regard to the provision of huge quantities of toluol for high explosive purposes.

“That toluol exists in various petroleums has been known for some years, but we are safe in saying that there is no known petroleum from which so large a percentage of toluol can be extracted as from the Borneo petroleums. The important discovery was made as the result of investigations carried out at the Cambridge University while we were at peace with the world, and possibly for this reason the British authorities declined the offer which was made to them at that time by the SHELL group.

“Eventually, however, the offer was made to the French Government, when it was accepted with an open hand. Prior to the final closing of the agreement—and it is this step which speaks volumes for the patriotism of the gentlemen in charge of the SHELL interests—the British Government was again approached. Meanwhile the Explosives Department, under Lord Moulton, had been searching in vain for

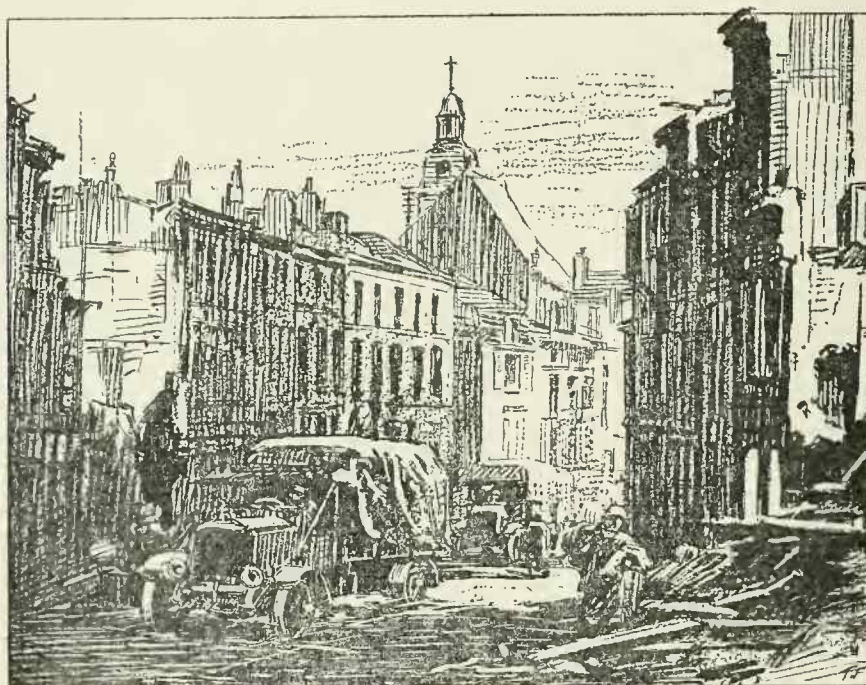
toluol in large and practically unlimited quantities, yet unable to find it, and as a consequence the output of high explosives had obviously been restricted. This time the offer of SHELL was eagerly accepted, and, to cut a long story short, arrangements were forthwith made whereby this country received, we believe, considerably over one-half of the total quantities available, the rest going to our Allies. The output of high explosives was immediately increased, and this to an enormous extent, while *as a direct result—and of this there need not be the slightest doubt—victory to-day is with the Allies.*”

M. Bérenger’s high tribute to SHELL, in the course of his notable speech, follows ; and it is particularly interesting to note that the French Government has conferred upon Mr. H. W. A. Deterding the dignity of “ Officier de la Légion d’Honneur ” :—

“ May I be permitted to state here solemnly, gentlemen, in the name of the French Government, how much gratitude we owe in a special way to Mr. Deterding and to his associates, and to the Asiatic Petroleum Co., for the support which they gave since October, 1914, to the defence of our country by placing at our disposal their precious petrols from Borneo and Sumatra which contained the toluenes, the xylenes and the benzenes which were *absolutely indispensable for the manufacture of our most powerful explosives, and of our most efficient extra-aviation petrols.* Mr. Deterding is known and loved in France, not only as the gentleman who has endowed the admirable Dutch hospital of our Pré-Catela and so many other good works in our departments devastated by German barbarism, but also and especially as one of the most powerful industrial collaborators in the defence of Verdun and of the two victories in Champagne.

“Thanks to toluol, we were able to return blow for blow the ‘cards’ sent us by the Germans from their great cannon : *without this invaluable explosive*, given to us at a time when we most required it, *the war would have been lost*. It fired our great cannon, and, in a word, **SAVED VERDUN.**”

M. BÉRENGER.



“ It saved Verdun ”

SHELL'S Colossal Output of Toluol for High Explosives

*A Great Toluol Distillery's Dramatic
Flight across the North Sea*



ATIONAL disaster could not have been averted in the spring of 1915 had not the appalling shortage of high explosive shells been promptly met. The Government was at the time deriving its output of toluol—the basic ingredient of T.N.T. (Tri-nitro-toluol)—exclusively from coal tar sources ; but despite the installation of new plant and the introduction at gas works throughout the Kingdom of special processes to accelerate production, the supply remained hopelessly inadequate to meet the colossal demand.

It was at this crisis, when the eyes of the world were focused upon Britain in her dilemma, that SHELL approached the Government with a proposition to supply, in large quantities, toluol to be extracted from a straight-run benzine unique in its proportion of toluol and other chemical compounds essential in the manufacture of high explosives, obtained from a particular crude SHELL petroleum found in the far Eastern island of Borneo.

The Company's proposition was at once adopted, and the matter being of extreme urgency, every possible unit of the vast SHELL organisation at home and overseas was placed unreservedly at the disposition of the Government.

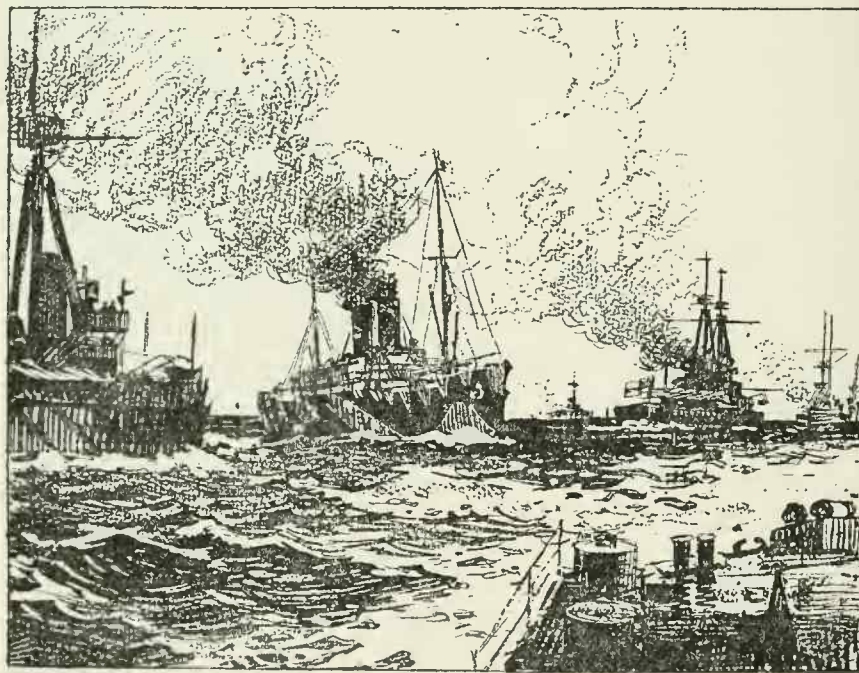
No distillery for the purpose of extracting the toluol was available in England, but happily the Company possessed just such a plant at Rotterdam, in Holland.

This was transferred, lock, stock, and barrel, from Rotterdam to Portishead, in Somersetshire,

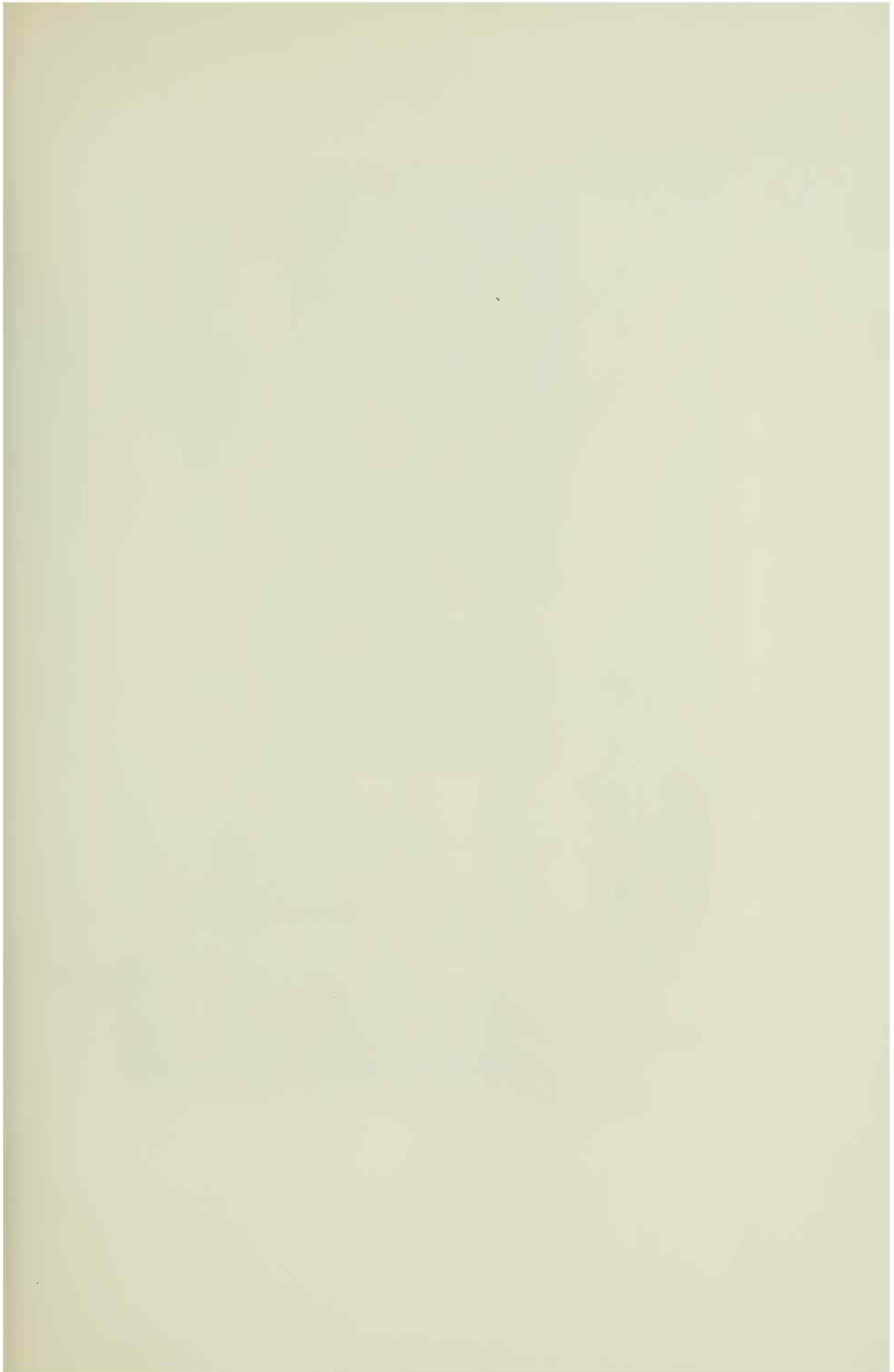
Out of Fritz's Reach.

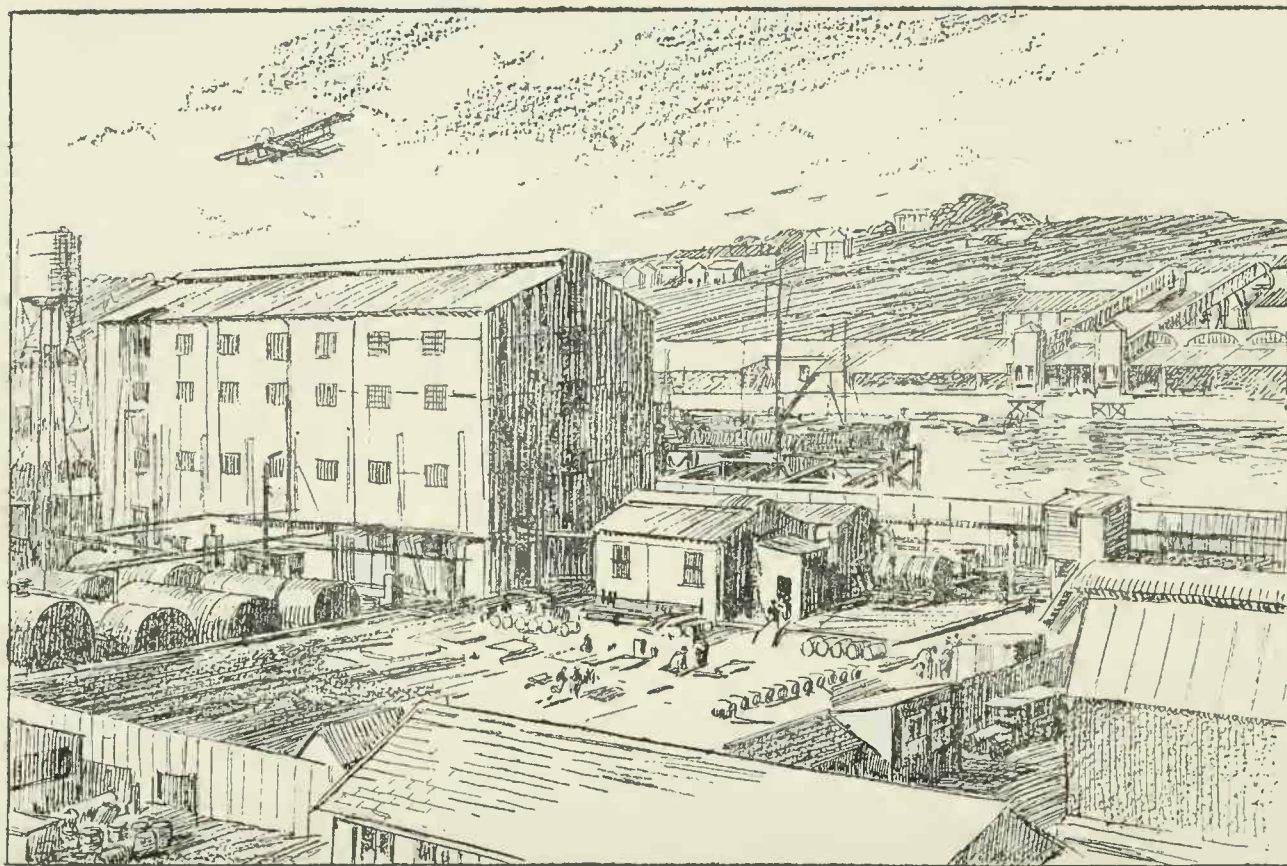
Speed was vital. Men were being killed every day in France whose lives would have been preserved by an adequate supply of high explosive ammunition. To save a day was to save priceless lives.

In an incredibly short space of time, the distillery was dismantled and shipped on a steamer specially chartered for the purpose by the Government, which, contrary to all regulations, left Rotterdam after dark. Had a lucky torpedo from a U-boat found its mark in her, the course of the entire war might have been altered. But fortune favoured the audacious enterprise. When the vessel appeared at dawn off the English coast she was met and escorted into the Port of London by British destroyers.



Naval Escort Meeting Rotterdam Plant





SHELL Plant at Portishead, which maintained an output of 1,100 tons of toluol benzine per month—sufficient for about 1,300 tons of T.N.T.

Special orders had been issued officially to the London dock authorities to have the vessel unloaded with the greatest possible dispatch. Lighters and tugs were already in attendance, and swung the cargo up on a flowing tide to Brentford, where railway trucks lay waiting to convey the precious equipment across England. Some sections of the weird plant were as large as ten feet in diameter. The railway line from Brentford to Portishead was cleared to safeguard against hitch or delay. In the morning the trucks were at Portishead. Here, again, speed and organisation had seized time by the forelock. Land had been acquired, foundations laid, and walls raised. Cranes stood at attention waiting to swing the apparatus into place. Everything was in readiness to ensure that the plant would be put into operation in the shortest time humanly possible. As a result of this exceptional piece of organisation and co-operation between the Government and SHELL, the distillery, which it would in the ordinary course of things have taken many months to build and equip, was in full swing in the extraordinarily short period of six weeks! That this supreme effort was more than justified is evidenced by the fact that from the day of the completion of the Portishead distillery to the Armistice, the plant turned out *eleven hundred tons of toluol benzine per month*—sufficient for about 1,300 tons of T.N.T., in addition to vast quantities of Xylol used by the French Government in their manufacture of high explosives.

Wisely providing against the risk of destruction of the Portishead distillery, the Government instructed the Company to erect a duplicate distillery. Barrow-in-Furness, where SHELL had already an ocean bulk storage installation, was the site decided upon. The second distillery was similar to that of Portishead, save that in this case all the plant was made in Britain. In addition to the distillery, tank storage was put in to accommodate a

further 12,000 tons of the products. This second distillery was completed during the same year.

From these distilleries, the toluol was dispatched by tank cars to either Oldbury or Chester, where the operation of converting it into T.N.T. was completed. As the acids necessary for nitrating (*i.e.*, converting the toluol into tri-nitro-toluol) took much longer to produce than the toluol, stocks soon accumulated at Portishead, until at one time the reserve reached 4,000 tons. The Company thereupon undertook, at the request of the Ministry of Munitions, the erection of special nitrating plants at Oldbury (near Birmingham) in the early months of 1915, and at Chester later in the year.

Within eleven weeks, green fields at Oldbury became converted into a busy hive of war industry, in spite of the fact that every unit of the huge equipment had to be manufactured in the country. This nitrating plant, which cost some £600,000 and covered eleven acres, had a productive capacity of 450 tons of *M.N.T.* (*mono-nitro-toluol*) *per week*. In its early stages, it was managed and worked by the Company, who brought from Holland a staff of Dutch chemists to train operatives in the nitrating process, so that SHELL was able to hand over to the Ministry of Munitions not merely a complete plant and equipment but one manned by highly-trained operatives.

So successful was the Oldbury Nitrating Plant that the Ministry of Munitions requested the Company to undertake the building and equipment of a much larger plant at Chester. Four months later a veritable industrial village employing 2,500 hands had sprung up where formerly had been waving fields of corn, especially harvested to give place to this stern work of war. This magnificent Chester plant, which cost approximately one-and-a-half millions sterling to build and equip, covered some 80 acres, and contained, in addition to the storage tanks, nitrating plant, agitators and distilleries with their buildings, eight large boilers with

plant for handling coal and ash, an electricity generating station with sub-stations, a jetty, a complete experimental plant including a distillery, a ferro-concrete reservoir for 8,000 tons of water, a water-supply system handling 800 tons of water per hour from the historic River Dee, and a fire service with automatic pumps. The capacity of the factory was 700 tons of M.N.T. per week, together with quantities of T.N.X. (tri-nitro-xylo) and D.N.B. (di-nitro-benzol). Upon completion, the plant was operated by SHELL on behalf of the Ministry of Munitions until the summer of 1918.

During the critical year of 1915, SHELL'S Portishead distillery produced approximately

*80 Per Cent. of Britain's
Total Output of Toluol!*

The Portishead total up to the date of the Armistice was 18,500 tons of toluol, and Barrow's output 11,600 tons, making a total of 30,100 tons, a figure almost identical with that of the output of toluol of the entire British gas industry from the outbreak of the war to the signing of the Armistice. This total yielded approximately 60,000 tons of T.N.T., sufficient for nearly a quarter of a million tons of high explosives for mines, bombs, and shells.

For his exceptional services in the vital work of organising the distilleries and nitrating plants for the Government, the Company's Chief Engineer, Mr. W. R. Aveline, has had conferred upon him the distinction of the O.B.E.

The SHELL Armada

How SHELL Pioneered Liquid Fuel

“



Oil.”—M. BERENGER.

HE present victory was gained by the blood of the Poilus, the Tommies, the Arditi and the Yanks, but it could not have been gained without that other blood of the earth which is called oil. The Victory will no longer be that of Samothrace, but the *Victory of Fuel*

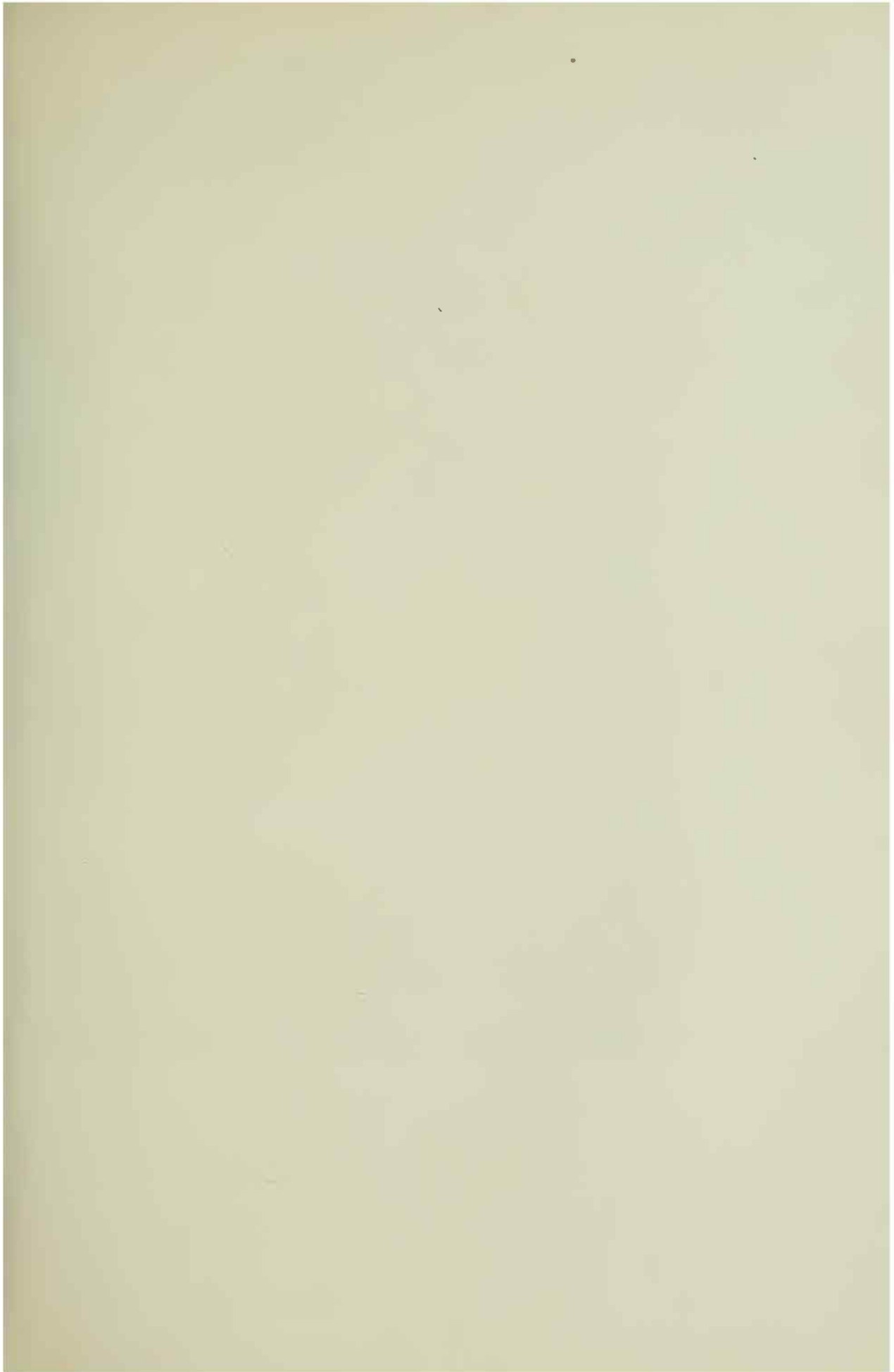
Kipling's

“ Ram-you-damn-you liner
With a brace of bucking screws ”

was in the old days tethered to her supplies of coal. Today, equipped with fuel oil tanks, she is free of the whole world, and where oil is used can cut her way. This is but one aspect of the revolutionary influence of oil on the conditions of victory emphasised in M. Bérenger's striking statement above. For the Allies' consumption of liquid fuel in the course of the war falsified all calculations, running into millions of tons, and these millions meant the conservation of half as many millions more tons of coal, saved to the Allies for the purposes of manufacturing munitions, maintaining the railway services, and keeping the home fires burning.

“ The SHELL group was alone responsible for the introduction of liquid fuel,” states the *Petroleum Review* ; and in an important article in the *London and China Express*, Sir Marcus Samuel tells an absorbing story of the way in which the fuel that contributed so much towards winning the war was pioneered by SHELL.

“ No one can, or probably would, dispute the claim of the SHELL Company to have been the missionaries in





MAP SHOWING LOCATIONS
OF THE COMPANY'S
OIL-FUELLING STATIONS
ENCIRCLING THE EARTH

Stanford's Geog. Estab. London.

the cause of liquid fuel and its practical use throughout the world," Sir Marcus writes. To trace the genesis of this great enterprise, we have to go back twenty years to the Company's striking of oil in Kotei, East Borneo. "This petroleum proved of very heavy specific gravity," says Sir Marcus, "and threatened great difficulties in finding a market. So we decided to adapt our ships to burning it as fuel under their boilers. This was so successful that we urged it upon the British Government, giving them every opportunity of seeing it working, and for their better conviction bringing home a steamer under liquid fuel from Borneo *via* the Cape to London. The steamer (the *Murex*), which accomplished this historic voyage, brought petrol in bulk the first time that it has ever been so carried, constituting another record for British enterprise." To-day liquid fuel has taken the place of coal on practically all the capital vessels of our Navy, while the auxiliary cruisers have also passed from coal to oil.

The same is rapidly becoming true of our merchant marine: "Hundreds of steamers are being fitted to-day for burning liquid fuel, and great plans exist for building ships with internal combustion engines for the use of heavy oil. Vast preparations are also being made," Sir Marcus adds, "for developing aviation, by which places unknown either to motor traffic or to railways may be reached, and some of the advantages of civilisation carried to many astonished natives."

The work of SHELL has not ended, however, with the pioneering of liquid fuel. The Company has established liquid fuel supply stations which so completely girdle the earth that it is possible for a fleet to make a voyage around the world on fuel drawn solely from SHELL sources of production. Thus, in Suez there are the supplies from the Egyptian fields; in India there are Karachi, Bombay, Calcutta, Madras, and Colombo (Ceylon), and in the Straits Settlements, Singapore. The Pacific is

supplied by the SHELL Company of California. In the Far East are the Dutch Indies and Sarawak, the main sources of SHELL supply ; and in Mexico, Trinidad, and Venezuela there are further SHELL associations. Large installations for the storage of liquid fuel are maintained at both ends of the Panama Canal, also in China and Australia ; and additions are constantly being made to the various depots throughout the world.

The peculiar character of the Borneo oil, which proved so vital a factor in winning the war, has led to the discovery of extremely valuable by-products. No less than 12,000 tons of paraffin wax per year, many millions sterling in value, are extracted. Varnish is also manufactured, and last but by no means least, the oil is the source of a great series of base dye products which threaten the pre-war German monopoly in this important market.

Romance of the Double-Bottom Boats

*How SHELL Helped to Save the Navy
in the Crisis of 1917*



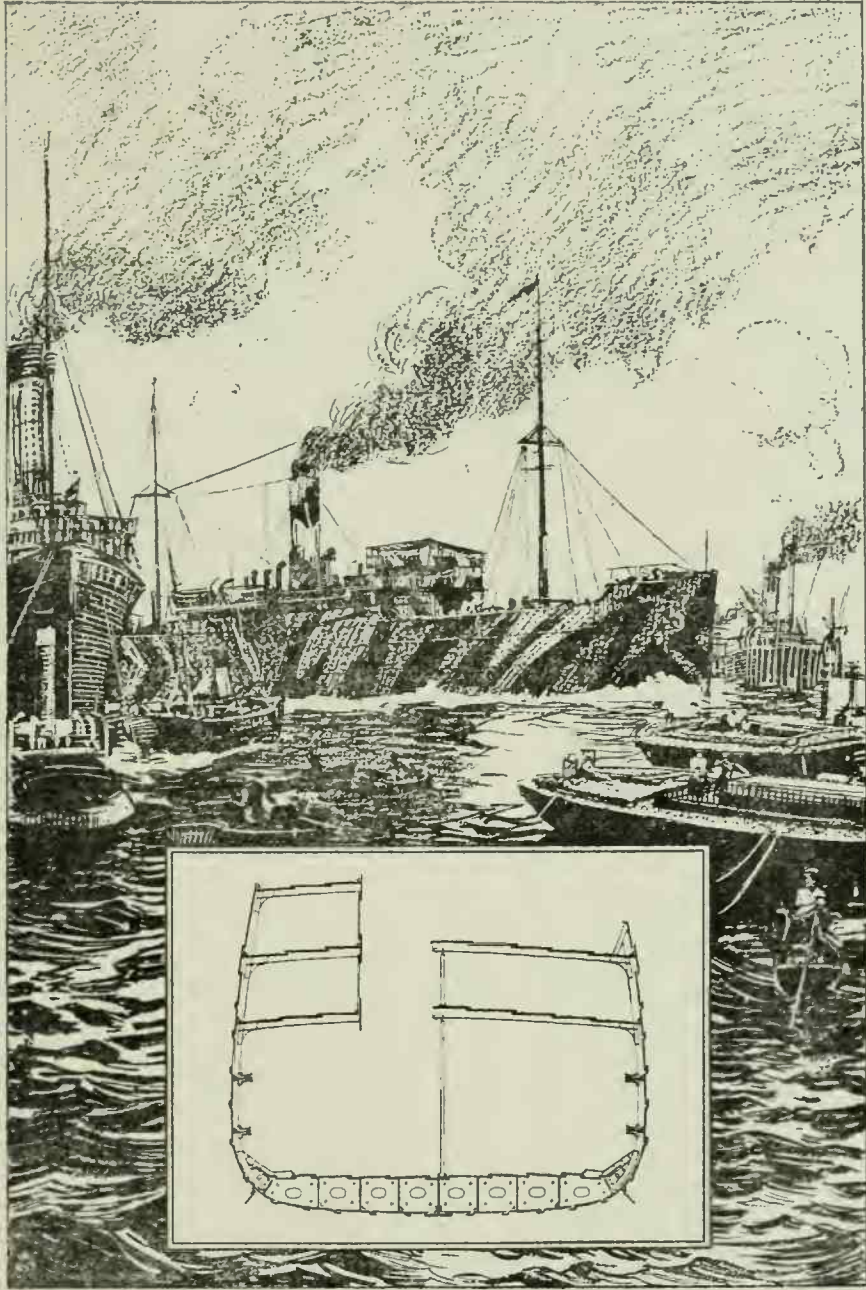
NAVY without sufficient fuel would have been a navy lost and a cause defeated. No less a disaster than this threatened Britain in the tank tonnage crisis of 1917, when, according to the official statement issued since the Armistice by the Ministry of Shipping, it became apparent that unless the quantity of tank tonnage was increased to a very large extent indeed, to compensate for losses through the intensive submarine warfare and for the enormously increased consumption of liquid fuel by the Navy, stocks of petroleum products in this country would sink to an alarming point. By this time, all the principal vessels of the Navy, as well as auxiliary cruisers, were depending entirely upon liquid fuel, a fact well known to the enemy, who accordingly made oil-tankers specially-marked targets for their submarines. Earl Curzon of Kedleston is authority for the statement that the exercises of the Grand Fleet had to be curtailed in consequence.

It was at this crisis that SHELL put before the Admiralty the proposition of bringing liquid fuel from abroad in the "double-bottoms" or ballast tanks of ordinary merchant ships—a plan which years earlier the Company themselves had successfully employed—to supplement the alarmingly reduced tanker fleet in conveying fuel oil to this country.

This idea, the details of which were worked out on behalf of the Admiralty by Mr. C. Zulver, the Company's Marine Superintendent, proved the one possible solution to perhaps the most baffling problem the Admiralty had to face throughout the war. During the most critical period, as much as 125,000 tons of oil was carried in this way in one month, and by the date of the signing of the armistice,

1,014,570 *Tons of Liquid Fuel*

had been safely brought over under this scheme. Stores of oil had reached a normal amount, and all danger of another shortage had long since passed. "As a result," says the *Petroleum Review*, "the whole military situation was saved, and a position which had been viewed with official alarm had been removed. The whole credit for this must go to the SHELL group, for it was under the policy which they laid down that several hundred ordinary cargo vessels have been so converted as to carry liquid fuel in their double-bottoms, in addition to the standard ships under construction. *This new fleet is equal to the services of at least one hundred oil-tankers*, though even this immense tonnage does not include the principal ships of the White Star Line, which have also been converted into oil-carriers by their owners. The enormous possibilities in this direction may be judged when it is mentioned that the *Vaterland* (interned for so long by the United States and renamed the *Leviathan*) "is now capable of carrying several thousand tons of liquid fuel in her double-bottom on one voyage."



How SHELL converted the Double-Bottoms of Cargo Steamers. Section sketch shows the "double-bottoms" used for ballast water, which SHELL adapted to carry fuel oil for the Navy. By these means 1,014,570 tons of fuel oil were brought safely over during the tank tonnage crisis



How SHELL Converted the Ships

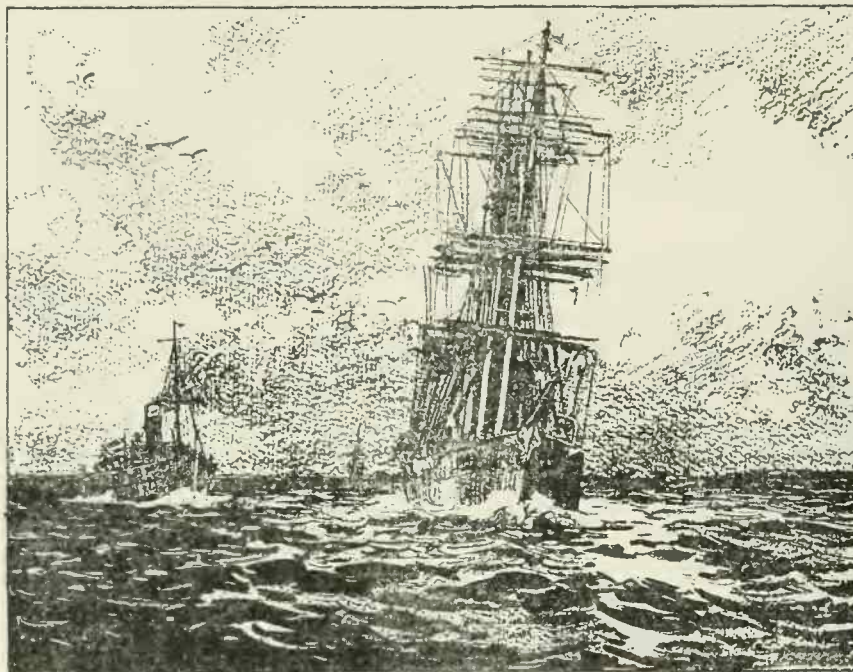


LTTOGETHER 1,280 ships were converted for the conveyance of oil in their ballast tanks by SHELL—an achievement that was reflected in the roaring of a thousand munition furnaces and the glow of a million home fires, since all these must have gone short even to famine point had the “double-bottom boats” inspiration not been forthcoming to solve the liquid fuel problem.

The story of the work of conversion, as told to the writer by Mr. Zulver, is one of the greatest interest. When the proposition was first mooted, the objection raised by the authorities was that the work would take too long and would make too great a demand upon our shipyards, which were already working at war pressure. “On the contrary,” replied Mr. Zulver, “it need make no demand at all upon home labour, as the conversions can be made in overseas shipyards. And so far as time is concerned—let it be tried. There is a cargo boat *en route* to Java. Let her be sent to Hong Kong, and I will undertake that within three months she shall be an oil freighter.”

Highly dubious as the authorities were, they nevertheless showed themselves very ready to try out any possible solution, however remote. They gave the necessary sanction for the vessel to proceed to Hong Kong, and—not in three months but in precisely *two months and two days*, she was a converted oil freighter!

There was an 8,000-ton dummy warship, for which the Admiralty had failed to find any use since its return



Sailing Vessel converted to use Fuel Oil

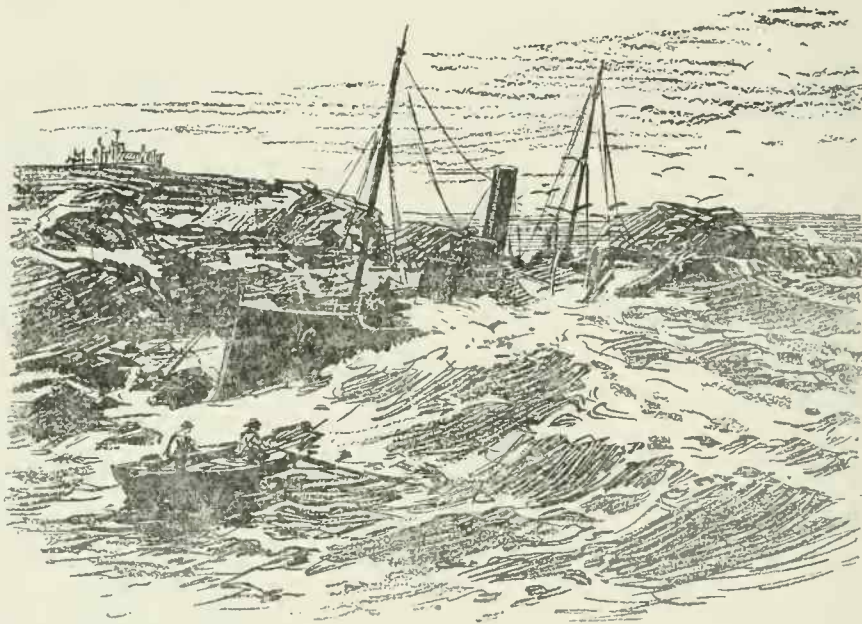
from the Dardanelles. Mr. Zulver asked that he might convert this, and within a surprisingly short space of time this superseded vessel was on its way home from the Far East, freighted with 8,000 tons of precious oil. A German prize ship which had long lain disabled on the Italian coast, was next salvaged to become a valuable oil-carrying vessel. Not only liners and ordinary cargo boats, but even colliers, were pressed into service under this scheme. At the time of the dramatic collapse of Russia, it came to Mr. Zulver's knowledge that a large engineering concern had been left with a number of internal combustion engines on their hands. These he bought for the Admiralty, and had them fitted in sailing vessels, which were then adapted to carry oil. A considerable number of sailing vessels were thus converted, and together accounted for the transportation of large quantities of petroleum products.

As a mark of appreciation of the great service rendered the nation in respect of the double-bottom boats, the Admiralty presented Mr. Zulver with a handsome service of silver; and in publicly announcing the high valuation they placed upon his unremitting efforts, they pointed out that, "apart from the valuable results achieved by this scheme during the war, the experience gained of carrying oil in this manner will certainly be of value in connection with the development of petroleum as a fuel for steamers after the war." This latter had already been foreseen by SHELL, who at the time of the Armistice were actually engaged upon the conversion of 64 big liners from coal to liquid fuel.



Silver presented by Admiralty to Mr. Zulver

This work is continuing, and 30 of the liners have already been converted. The consequent saving of coal to the nation exceeds *a quarter of a million tons of coal per year*—an economy that will be doubled by the time the entire 64 vessels are completed.



Disabled German Prize Ship, salvaged and converted to Oil Carrier by SHELL

Adventures of the SHELL Fleet

21 Vessels Torpedoed or Mined



THE "SHELL Armada" consisted of three divisions : First, the introduction of liquid fuel and the maintenance of a world-encircling chain of supply stations, thereby contributing to the efficiency of the Allied fleets ; second, the introduction of "double-bottom boats," whereby no less than 1,280 merchant ships became naval auxiliaries ; and third, SHELL'S own fleet of 75 vessels which passed into Government service in the course of the war. Far from deriving any financial benefit from this development, the Company suffered very materially owing to the fact that, whilst chartering the steamers to the Admiralty at Blue-Book rates, more than four times the rate had to be paid for neutral tonnage to cover their own requirements, and even on those terms it was impossible to obtain sufficient tonnage to maintain the Company's business.

"The story of the SHELL Armada," said the *Tatler* in a review of SHELL'S war romance, "is a moving one. Its units ploughed the seven seas, and all the terrible risks they contained they gloriously surmounted." The 75 vessels of the SHELL Fleet nevertheless bore their full share of the losses inflicted by the enemy's merciless tactics ; no fewer than 21 were either torpedoed or mined, of which twelve were sunk, representing a loss of 67,600 tons register.

*Vessels of the SHELL Fleet Torpedoed
or Mined during the War*

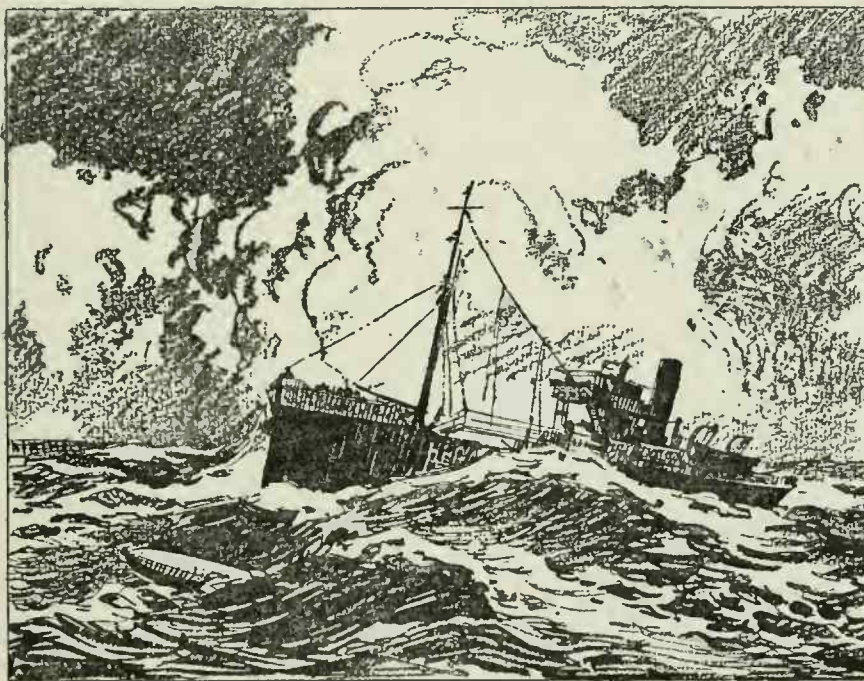
<i>Goldmouth*</i>	Torpedoed
<i>Elax*</i>	Torpedoed
<i>Conch*</i>	Torpedoed
<i>Murex*</i>	Torpedoed
<i>Ares*</i>	Torpedoed
<i>Hestia*</i>	Torpedoed
<i>Telena*</i>	Torpedoed
<i>Bullmouth*</i>	Torpedoed
<i>Bulysses*</i>	Torpedoed
<i>Arca*</i>	Twice torpedoed
<i>Trocas*</i>	Torpedoed
<i>Romany*</i>	Torpedoed
<i>Goldshell</i>	..	..	..	Mined
<i>Juno</i>	..	..	..	Mined
<i>J. B. Aug. Kessler</i>	..	..	..	Torpedoed
<i>Artemis</i>	..	..	..	Torpedoed
<i>Mitra</i>	..	..	..	Twice torpedoed
<i>Eburna</i>	..	..	..	Mined
<i>Strombus</i>	..	..	..	Torpedoed
<i>Argonauta</i>	..	..	..	Torpedoed
<i>Clam</i>	..	..	..	Torpedoed

* Indicates vessel lost.

The stories of heroism that might be told of the men of the SHELL fleet would more than fill a bulky volume. They cannot be given here ; but our record would be woefully lacking if it had no reference to the extraordinary nerve and daring of the gallant crew of the Dutch boat *Hera*. With no protection and no armament whatever, this little 500-ton motor-propelled boat plied continuously from the early days of the war till its end, between England and France, in the very heart of the danger zone, laden always with highly inflammable

material which, had the vessel met with mishap, would have meant instant annihilation. Such bravery and fearlessness would have been admirable in a combatant ; in a neutral vessel manned by neutrals it was doubly so, and it is gratifying to record that every member of the crew, from the Captain downwards, is to receive a gold watch for conspicuous bravery. Although the *Hera* ran on charter rates, representing a heavy loss to SHELL, the Company themselves gave the men the extra pay they so richly deserved.

The *Ares* and the *Hestia* are two other Dutch ships of the SHELL fleet whose men highly distinguished themselves in their brave and loyal service, carrying highly-inflammable cargoes across the mine-infested and pirate-ridden seas, with a complete indifference of personal danger. No less adventurous were the duties of the



The *Hera*

British SHELL boats. The *Turbo* was attacked by a submarine in the Mediterranean, but by clever manœuvring succeeded in averting disaster and getting safely to port. The *Goldmouth* made an even finer resistance, and, with the wireless telegraphist and one of the engineers wounded, kept a German submarine at bay for no less than six hours.

These are but tiny vignettes taken from a splendid and continuous record of courageous and resourceful deeds that are all the more admirable and impressive because they were achieved, not in the heat of fighting, but in patient unseen endurance of lonely vigils on seas infested with lurking and invisible foes.

SHELL'S

Campaign Overseas

*Distributing 10,500,000 Gallons of
Petrol a Month*

ONE OF THE ORGANISATION MARVELS OF THE WAR



CONTEMPLATE an Army of millions almost wholly dependent upon petrol for the maintenance of its lines of communication in the most extensive theatre of war history has ever known—consider the demands of countless thousands of motor lorries, to which man, beast, and gun could alone look for food supplies; of vast numbers of staff officers' automobiles ever hurrying from point to point on business of vital urgency; of the formidable armies of tanks, deciding factors in so many critical encounters; of the petrol-hauled siege guns and caterpillar tractors; of the legions of aeroplanes and airships ever dotting the sky; of the submarine-chasers in their restless search for undersea pirate craft; of the inland waterways and coastwise motor boat traffic.

Then contemplate the catastrophe that must have followed the snapping of any one link in the great chain of petrol supply, and some idea will have been gained of the immensity of both task and responsibility which rested upon the shoulders of the Company when, at the request of the Government, SHELL undertook the organisation of petrol supplies for the British forces.

In the early months of the war, SHELL's Portishead petrol installation was the principal source of supply



SHELL behind the Lines

for the British Expeditionary Force. It soon became evident, however, that this installation was inadequate for coping with the multiplying needs of the Army ; and as the situation on the Western front developed, extensions became acutely urgent. Notwithstanding extraordinary measures to increase the output of the familiar two-gallon SHELL cans, it was a sheer impossibility to keep pace with the demand ; and, recognising this, the Company diverted to Portishead one of their can-manufacturing plants with a capacity of 8,000 cans per day, which was on the point of being shipped to the Far East in connection with the Company's own business.

In order that the new plant, upon its arrival, should be got running without a moment's delay, the manager of the Company's Fulham can-making factory was instructed by wire to send to Portishead a squad of his women operatives, under a forewoman, so that the new



Petrol—the principal means of maintaining the lines of communication for an Army of Millions



hands might start their duties under expert supervision. The telegram was despatched on the Saturday morning ; when the factory whistle blew on the following Monday morning, the workers from Fulham were all at their new posts in the little Somersetshire town, and the plant was soon running at full swing.

The packing facilities were by this means vastly increased. The wharf was extended, and three new loading and discharging berths and pipe-lines put down. Admiralty craft put into Portishead docks, and loading, by means of a gravity transporter over a quarter of a mile long, went on by day and night. Frequently no less than

160,000 Gallons of Petrol Per Day

were shipped to the various base ports of France—a quantity sufficient to run a 9-minute service of cars round the world ! Empties by the hundreds of thousands poured in from France after “ doing their bit.”

Early in 1916, scarcity of tonnage and the submarine menace pointed to the necessity of transferring the distribution plant from Portishead to France. This the Company undertook on behalf of the War Office, working at cost without any profit whatever. The existing installation and ocean storage at Rouen was decided upon as the base. As it was impossible to disturb the supply of petrol to the forces, the transfer had to be made in instalments. The work in one half of the factory at Portishead was stopped at 4 o'clock on the Friday afternoon, and on the Sunday morning all the machinery of that section was aboard ship. By Wednesday it was almost entirely re-erected and in operation at Rouen. The remaining half followed from Portishead a fortnight later. The whole transfer was accomplished practically without a break in the supply of petrol—a piece of high-speed organisation that has few parallels even in the record-breaking story of the war.

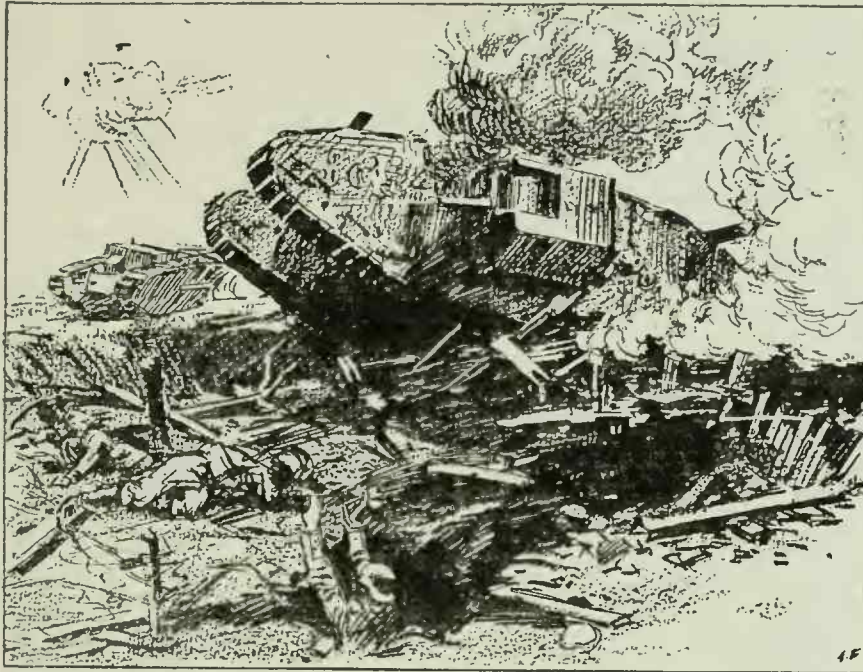
In order to avoid delay through training new hands in the work of can-making at Rouen, it was necessary to transfer the Portishead employees also. With the consent of the War Office, these men and boys, about 180 in all, were enrolled as a special Corps named the

Severn Cadet Corps.

They were hastily equipped, put under military discipline, and drilled. Ranging in age from 15 to 60, in height from 4 ft. to 6 ft., and in waist measurement from 26 to 48 inches, their appearance in France caused no little mystification, even amongst military authorities. Although partaking of the duties of the Expeditionary Force, they remained in the charge and pay of the Company.

Notwithstanding Rouen's output of packed petrol eventually becoming the largest in the world, its capacity was soon exceeded by the demand, and at the request of the War Office, SHELL at once made provision for a similar installation at Calais. In Calais, beyond certain petrol storage tanks belonging to a French Company, nothing that could be utilised for the installation existed. The Army already had a depot here for the storing of packed petrol shipped from England; and in the fields adjoining this depot SHELL started to erect the second colossal filling plant. This field was two miles from the storage tanks, and had to be connected by a pipe-line, which, together with a pumping plant, was completed ready to deliver petrol *within a fortnight* of its commencement! Additional storage subsequently became necessary, and a tank with a capacity of a million gallons of petrol was installed. The extent of the work may be imagined from the fact that the installations covered some fifteen acres, and had a daily output ranging from 150,000 to 200,000 gallons!

To replace the inevitable petrol-can "casualties" in



Britain's Petrol-driven Juggernauts

the field, large factories for making two-gallon cans were erected at both Rouen and Calais, the work being carried out in the incredibly short space of six weeks. Here were employed several hundred French women, a number of whom had previously been brought over to England at the Company's expense and specially trained in can manufacture at SHELL's Fulham (London) Works pending the construction of the French factories. 40,000 two-gallon petrol cans and 30,000 cases were manufactured weekly at Calais, and 30,000 cans and 28,000 cases at Rouen.

From Rouen and Calais, arteries of petrol supply spread out to all parts of the fighting zone, even as far as the Italian front. Each depot was the centre of a network of railway sidings totalling a considerable mileage, all specially constructed for the more efficient handling

of the packed petrol and the tank trains which were for ever arriving empty and departing filled. Petrol was also dispatched from these depots in bulk ; some of the bulk trains were made up of no less than 30 tank wagons, each of a capacity of 10 tons or 3,000 gallons of spirit. They were fitted with a special pump and piping devised by SHELL to facilitate discharge of the petrol into the regular road tank lorries which supplied the transport parks, the underground tanks, and the depot tanks at far-distant railway sidings whence Allied aircraft and lorries obtained their petrol. And so, wherever the flag of Liberty waved, there SHELL maintained a supply of spirit that never once failed the Allies throughout the war.

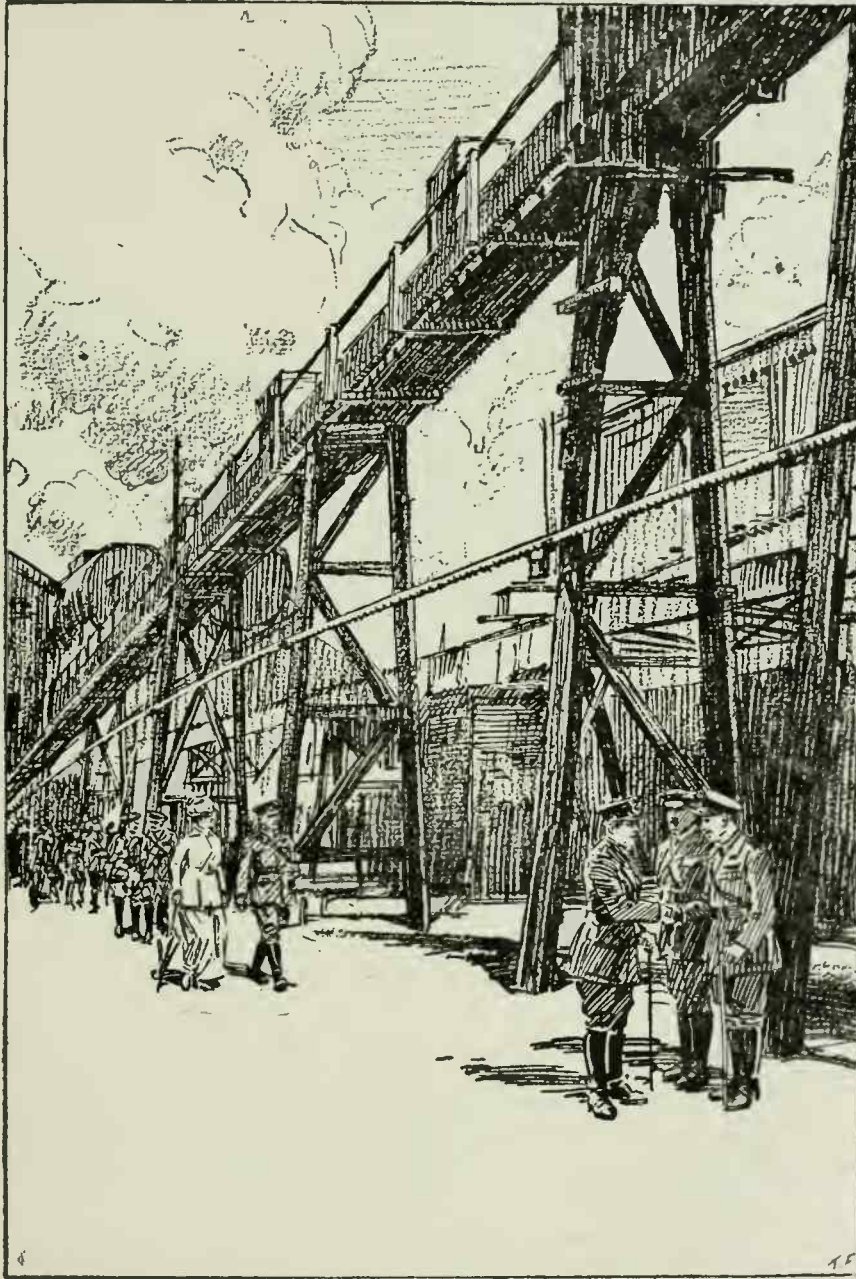
The number of employees at Rouen and Calais reached nearly 3,000, 2,400 of whom were women, and at the two petrol installations—the largest in the world—an output ultimately approximating

10,500,000 Gallons of Petrol Per Month

was handled! From so colossal a figure some idea may be gained of the enormous amount of cross-channel and land transport that was saved the Allies by the work of SHELL.

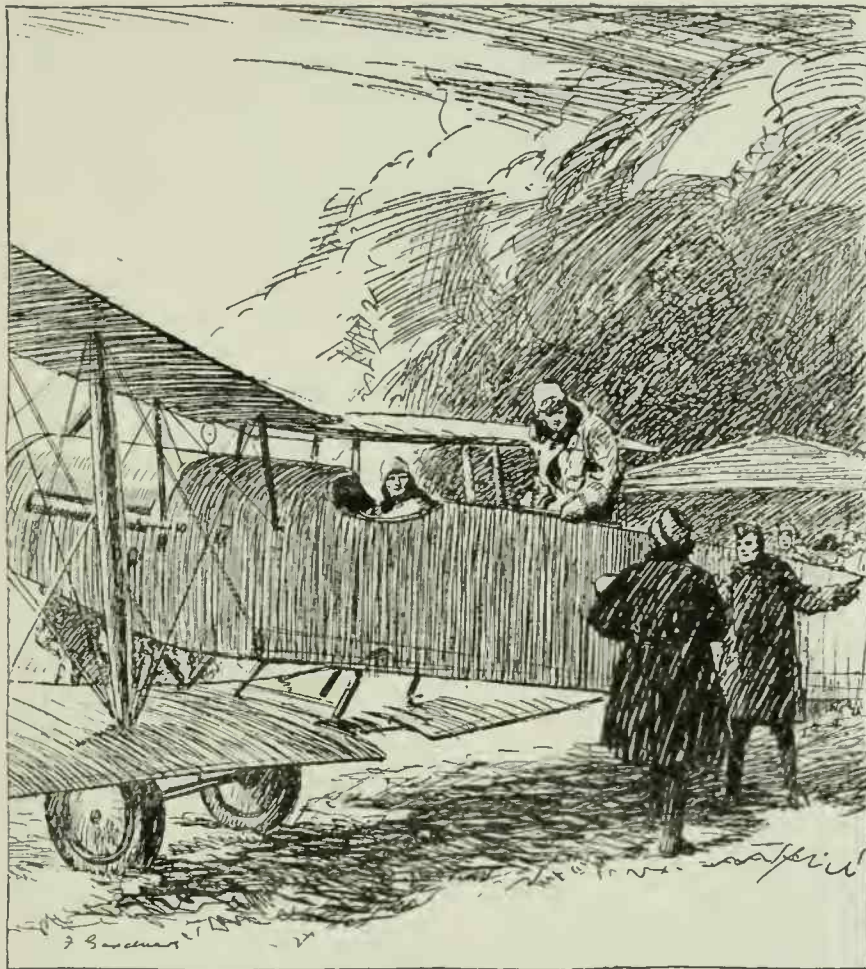
In order to supervise the organisation of the gigantic task of distributing ten and a-half million gallons of petrol a month to our forces all over France, one of the Company's busiest Directors paid "Flying Visits" to France by aeroplane under special Government permit, during his week-end breaks from the office, and Sir Reginald MacLeod, K.C.B., paid this giant of energy no more than his due when he said of him: "*He has been doing the work of ten men since August, 1914 . . . so that the resources of the SHELL Company should be placed at the services of those directing the great war.*"

During the course of the war, the huge installations at Rouen and Calais were inspected by many very



SHELL'S Rouen installation—one of France's twin plants
—the largest in the world.





Embarking for a "Flying Visit" to France

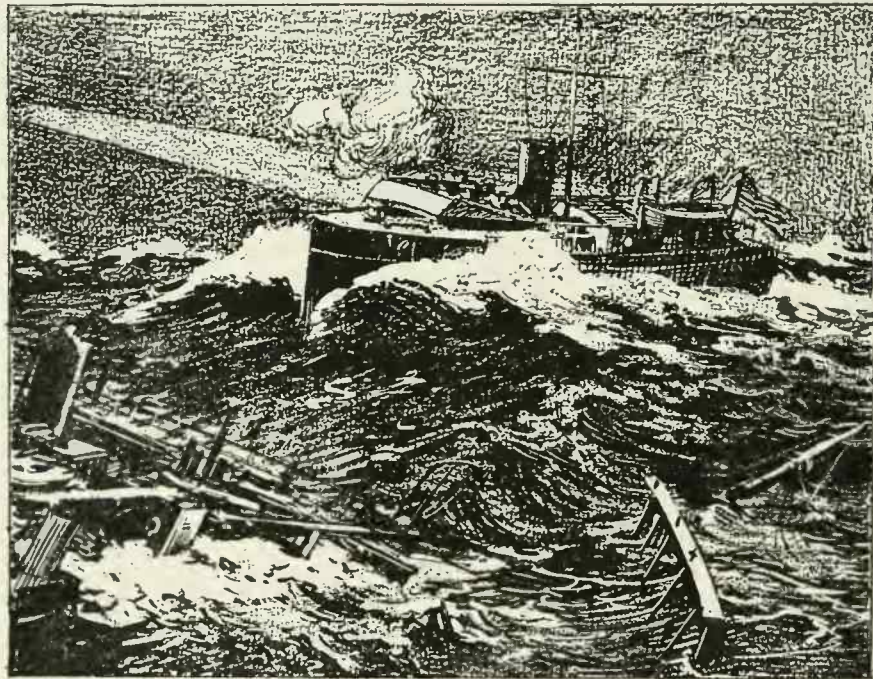
distinguished visitors, amongst them H.M. the Queen and the Prince of Wales, both of whom displayed considerable interest in the various operations.

Notwithstanding the establishment of a world's record—and one unlikely ever to be approached in future—by the ten and a-half million gallons of petrol *per month*, packed and delivered in the Western theatre of war, this by no means marks the limits of SHELL's activities. So satisfactorily was this stupendous task carried out that

the Government entrusted the Company with the distribution of spirit to our overseas forces in Macedonia, Palestine, Egypt, East Africa, Arabia, and Aden. Furthermore, every gallon of aviation spirit used by the British forces in all parts of the world was supplied and shipped by SHELL, from the fateful August of 1914 to the summer of 1917.

SHELL in U.S.A. and Canada

Upon the entry of America into the war, the resources of the SHELL Company of California and of the Roxana Petroleum Company were at once placed disinterestedly at the disposal of Washington. The special SHELL process for the refining of petrol was adopted by the American Munitions Department for the extraction of



American Submarine Chaser

toluol in the manufacture of high explosives, and the Company's fleet passed to the control of the U.S. Shipping Board. The Company's pipe-line from Cushing, Oklahoma, to St. Louis proved highly valuable in accelerating the transportation of petroleum. The SHELL installation at New Orleans was called into service for the collection of gasoline (as petrol is called in America), and its shipment to the American forces in France and elsewhere.

The American Navy drew fuel oil, and submarine chasers petrol, from the Company's supply stations along the Pacific coast, and SHELL supplied its quota of aviation spirit for the American forces. When the question of tonnage became acute, it was the privilege of SHELL to co-operate in the organisation of America's internal distribution of petroleum products, by which means considerable shipping was released for supplying the American Army in France with gasoline.

Montreal, Canada, which during the war was an important collecting station for the bunkering of British Admiralty boats, had to be kept regularly supplied with fuel oil, and there being no local production, the oil was brought from the State of Oklahoma, approximately 2,000 miles distant. In order to safeguard the regularity of supply, SHELL inaugurated a service of tank car trains covering the entire distance. More than 1,000 tons of fuel oil were carried in each train, and it was no unusual thing for as many as nine such trains to be run in one month. Nearly 200,000 tons of fuel oil were thus transported by SHELL from Oklahoma to Montreal.

How SHELL Saved Egypt from Fuel Famine

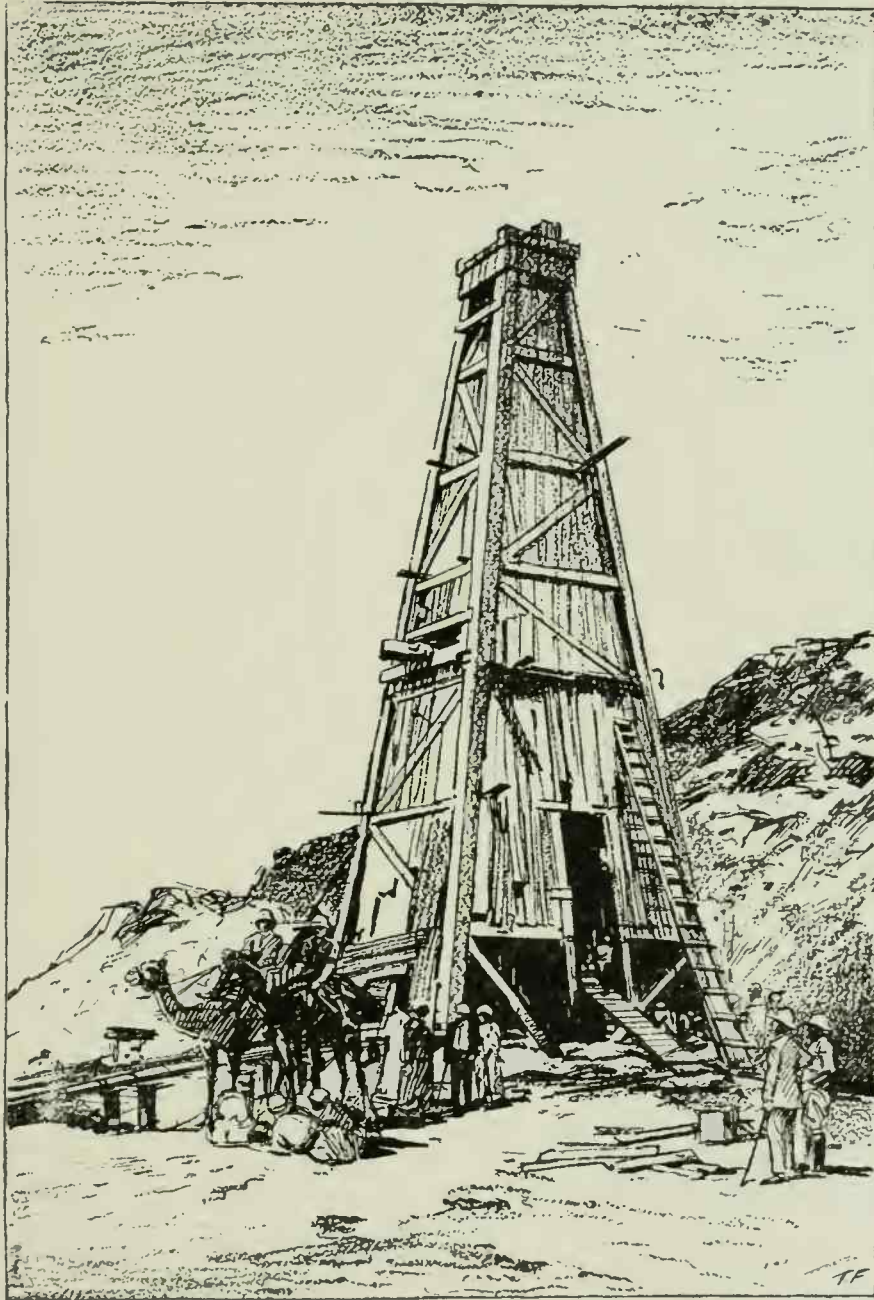
*Britain Released from Exporting Hundreds
of Thousands of Tons of Coal during
the Great Shortage*

FUEL PRODUCTION WITHIN THE EMPIRE



IT has long been the ardent desire of SHELL to develop the production of petroleum within the Empire, and vast sums of money have been devoted to this end. In most cases these efforts have been attended with discouraging results. After a very considerable expenditure in New Zealand, the hope of obtaining production there had finally to be abandoned. In the West Indian colonies, operations likewise had so far been disappointing. In the Hurghada oilfields of Egypt, however, the Company's enterprise was rewarded with a success that proved to be little short of the salvation of Egypt.

The petroliferous area lies about 180 miles south of Suez, on the Western shores of the Gulf of Suez, close to the sea. The existence of oil here, says the *London Times*, had been known from antiquity, and there are centuries-old traditions of a burning cave in the vicinity. It was not until the Anglo-Egyptian Oilfields (one of the SHELL group) acquired the property and exploration rights in 1911 that development took place on a large scale. Upon the outbreak of war, the far-seeing Directors,



Oil Well at the Hurghada Field, Egypt



anticipating the great part that petroleum products were destined to play in the war, employed every possible means of developing the output of the Egyptian Fields, with the magnificent result of an increase from 12,586 tons of crude oil in 1913 to 277,040 tons in 1918. The facts which follow establish that it is impossible to over-rate the value to the Allied cause of such an achievement—accomplished, too, under very difficult war conditions.

The oil from the Hurghada field is of a heavy nature, and gives a very large percentage of liquid fuel. When it was first struck the Anglo-Egyptian Oilfields proposed to the railway administration of Egypt the use of liquid fuel, but these proposals were not accepted. During the war, and particularly in 1916 and 1917, coal became unprocurable in Egypt. The Anglo-Egyptian Oilfields stepped in and saved the situation by its increased production of crude oil, and hence of liquid fuel. This "miracle," as the Chairman called it, by which Egypt was saved from the horrors of a fuel famine, and the shortage of tonnage for the requirements of the Empire was relieved to a great extent, has been officially noticed by Sir William Brunyate, the Acting Financial Adviser in Egypt, who, in a note on the Budget of 1918, says :—

"One of the most constant pre-occupations of the responsible authorities in Egypt during the war has been the question of fuel. Prior to the war, Egypt was mainly dependent on the United Kingdom for coal, of which she normally imported some 1,500,000 tons. The available wood of the country has been largely drawn upon, probably to a greater extent than was altogether prudent, but the situation has mainly been saved by two circumstances—the development of oil-fields in Egyptian territory on the Red Sea, and the adaptation of engines to produce a gas from vegetable refuse. Of the various companies formed to search for oil only one remained in operation at the beginning

of the war—the Anglo-Egyptian Oilfields (Ltd.), an offshoot of the SHELL group. Fortunately, in 1914, a field was discovered at Hurghada, the formation of which was found to be singularly regular.”

These considerations show that the geological researches carried out by the Company's experts have had most valuable results from the point of view of Egypt and the Empire at large, and it is worth recalling that, thanks to the foresight of Lord Kitchener, the Egyptian Government, besides receiving a fixed royalty, is actually a partner in this undertaking. It has spent nothing, but will receive 10 per cent of the profits.

In a recent speech, Sir Marcus Samuel estimated the fuel finances of Egypt to be improved, by the consumption of home-produced fuel, to the extent of no less than £6,000,000 sterling per annum. Sir Marcus further pointed out the immense gain to the Empire in the direction of obviating the necessity of exporting coal so acutely needed for British home consumption, and in the consequent saving of tonnage in a zone where the enemy submarines were particularly active. But for the home-produced fuel, the plight in which Egypt would have found herself, cut off as she was from supplies from America, Russia, and Roumania, may readily be pictured: a fuel famine that might conceivably have changed the whole course of events in the East would have been inevitable.

Only the main operations of SHELL in Egypt have so far been touched upon. No more than passing reference can be made to many other achievements, each in its way of vital importance, in which SHELL served the Allies' cause in Egypt. At Suez, British destroyers and submarines put in to fill their bunkers with oil, and monitors and other vessels of war took in their fuel oil for their duties in the Red Sea and the Mediterranean. Ships converted to the consumption of fuel oil at Port

Said drew their new fuel here and completed the rest of their journey to the East upon it.

Not only the British forces and aerodromes of Egypt, but those of Macedonia, Palestine, and East Africa were supplied with petrol from the Suez refinery, the output of which reached 100,000 *gallons per day*. As all petrol was supplied in the four-gallon cans commonly used in Egypt, a corresponding increase in the supply became necessary, and the factory output grew from 7,000 tins a day to the record figure of 35,000! In addition, the weekly output of kerosene—Egypt's chief source of artificial light and heat—was about 600,000 gallons, and the supply of this the Company undertook at the urgent request of the Egyptian Government when enemy submarine activity cut off all other suppliers.

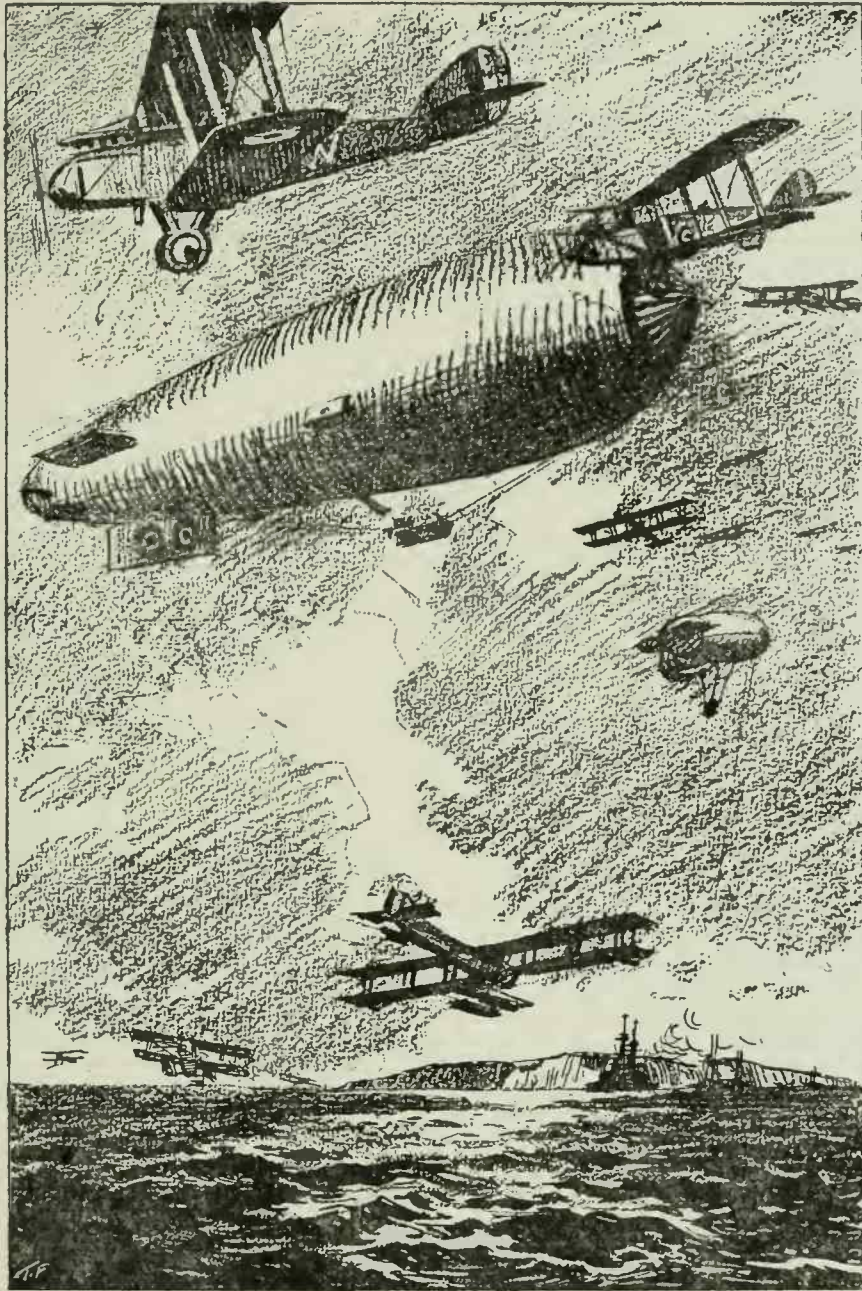
Britain's "Wings"

"SHELL Aviation" the Only Spirit Used by the British Air Forces during the Critical First Three Years of the War



WHEN one reads of brilliant aerial feats such as that of Capt. Sir John Alcock, D.S.C., and Lieut. Sir Arthur Whitten Brown, in their epoch-making flight from the new world to the old—1,920 miles in 16 hours 12 min.—a performance achieved on "SHELL Aviation" Spirit; of an altitude record exceeding the world's highest mountain; and of a projected air-race to the Antipodes, it seems inconceivable that it was barely a decade ago Farman set the world talking by flying 47 miles, 1,184 yards in 92 minutes (a little over 39 miles per hour), and Paulhan added a new sensation by reaching an altitude of 977 feet!

It was in the summer of 1909—no more than five years before the outbreak of Armageddon—that the first series of famous aviation meetings opened at Blackpool. The briefest possible survey of the events that followed will suffice to explain the airman's very marked preference for SHELL, and his dread, amounting almost to superstition, of "going up" on any other spirit. This was a matter of such importance that, during the anxious years in which Britain was achieving her air supremacy, SHELL *exclusively* was used for aviation purposes; and prior to the introduction of bulk storage at the aerodromes, SHELL was ordered for delivery in the red cans, being the only brand permitted to retain its distinguishing colour in place of the standard khaki.



From the outbreak of war until the summer of 1917,
every gallon of Petrol used by the British Air Forces
was "SHELL Aviation"



Following closely upon the records of Farman and Paulhan, both of which were created on SHELL, came the *Daily Mail* historic flight from London to Manchester. It will still be recalled with what scepticism Viscount Northcliffe's magnificent offer of a prize of £10,000 was received by the public. Such a feat was widely regarded as one impossible of accomplishment; but SHELL helped to make the "impossible" easy, and Paulhan, in April, 1910, carried off the world's first great aviation prize, with Grahame White, his rival, also flying on SHELL.

Viscount Northcliffe's second prize of £10,000, for a flying circuit of Great Britain, created no less a sensation than the first, the competing machines being seen by literally millions of people. Again the great award fell to a SHELL user, Beaumont, with Vedrines, the runner-up, also flying on SHELL. Thus, with SHELL first across the Atlantic in direct flight, all three of the *Daily Mail* £10,000 prizes have been won on this incomparable spirit.

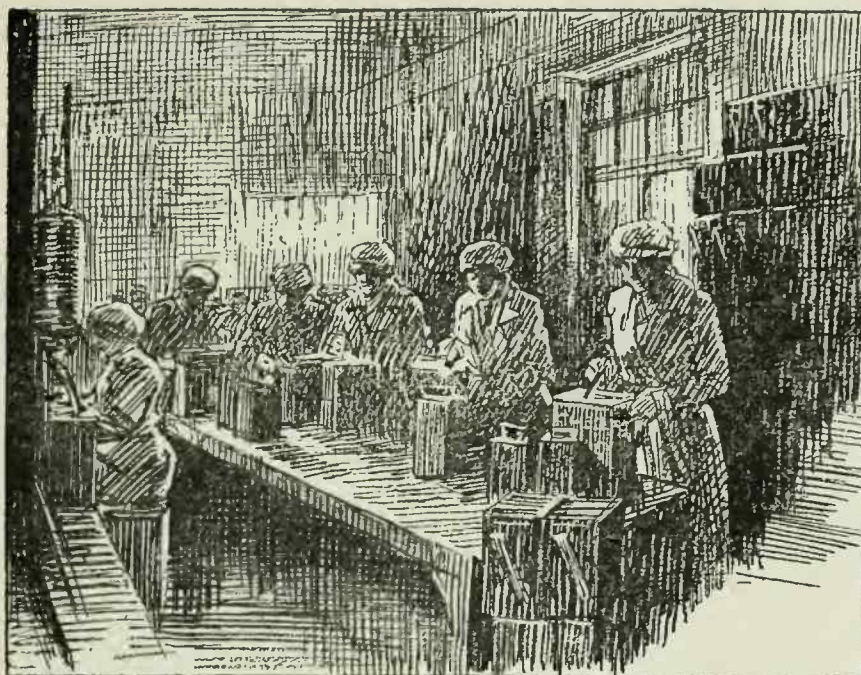
In the great aeroplane trials on Salisbury Plain shortly before the war, aviators refused to go up on anything but SHELL, insisting upon seeing their tanks filled before their eyes from the familiar red tins. The 1st Prize in the Naval and Military Competition was won with an All-British Green engine No. 1 running on "SHELL Aviation."

Records falling to SHELL might be recited to the point of monotony, but the greatest record of all, and one that is never likely to be approached in the world's history, is the fact that from the beginning of the war right up to the summer of 1917 every gallon of aviation spirit supplied to the Allied Flying Corps was SHELL. By that time, the air force had grown to such huge proportions that, notwithstanding "SHELL Aviation" having long since been withdrawn from the private motorist, it was no longer possible to keep pace with the demand, though the entire output of "SHELL Aviation" continued to be taken right up to the end of the war.

Realising that the life of an "ace" might conceivably depend upon the purity, efficiency, and uniformity of his petrol, SHELL has always taken the most elaborate measures to assure the absolute purity and cleanliness of Aviation spirit.

The crude oil is obtained by the well-known process of drilling. After the crude is produced it is transported to the refinery, situated on the sea-board, by means of large pipe lines of 8 to 10 ins. diameter. At the refinery the crude oil is carefully distilled and the super-efficient "SHELL Aviation" separated into special storage tanks. From the sea-board storage tanks it is transported in the Company's own bulk tank steamers to the United Kingdom—there again discharged into ocean bulk tankage at the main ports of the country. At these ports it is stored in tanks specially constructed for the purpose, incorporating a system of collecting the highly necessary and valuable lighter spirits that evaporate during the heat of the day, passing them through large pipes, condensing them, and returning them to the storage tank from which they evaporated—an illustration of the extreme care exercised in preventing the loss of so valuable a product.

From the sea-board tanks the spirit is transferred into railway tank cars, hermetically sealed, and transported to inland bulk depots for storage in the familiar round boiler tanks at the SHELL depots in every town of importance in the United Kingdom. Thence it is passed through small pipes to filling tanks. From these filling tanks it flows through smaller pipes to the automatic measures, each containing two gallons, which are gauged and passed by the local authorities as correct measurement, this being a simple mechanical operation which prevents the slightest chance of there being other than the exact two gallons in each can. In order to assure the utmost limit of safety in protecting the purity of the "SHELL Aviation," the spirit, when passing into the cans,



Examining inside of "SHELL Aviation" Cans by
Electric Torch

is strained through double strainers so fine that a fire flame could not pass through.

Every two-gallon can returned to a depot to be re-filled is washed out, without exception, with fresh motor spirit, by an ingeniously contrived machine that forces the spirit against the inside of the can with great rapidity and spraying power. It is tested with compressed air, examined by electric torch for the slightest speck of dust or rust, and instantly after filling sealed in a special manner that distinguishes its quality and safeguards it against the possibility of interference, or of being re-filled with an inferior spirit.

Thus the Allied airman has always known that one thing he need never worry about is his petrol—in "SHELL Aviation" he has the best, and there is no chance whatever of its "letting him down."

The very pronounced preference for SHELL by aviators universally throughout the British forces, by the Government itself, and in normal times by the private motorist, is no mere idle fancy but is based upon very sound reasons. The source of "SHELL Aviation" is entirely different from that of any other motor spirit. The fields are in the islands of Sumatra and Borneo, which Nature has endowed with a crude oil that is singularly rich in its proportion of motor spirit of a character especially suited to the requirements of gigantic-powered aero engines flying at enormous speed, at altitudes involving wide variations of temperature.

Fuelling the Allied Air Fleet

*How SHELL'S Transformation of
Methods Multiplied Efficiency*

AEROPLANES WITH A 1,400-GALLON PETROL CAPACITY

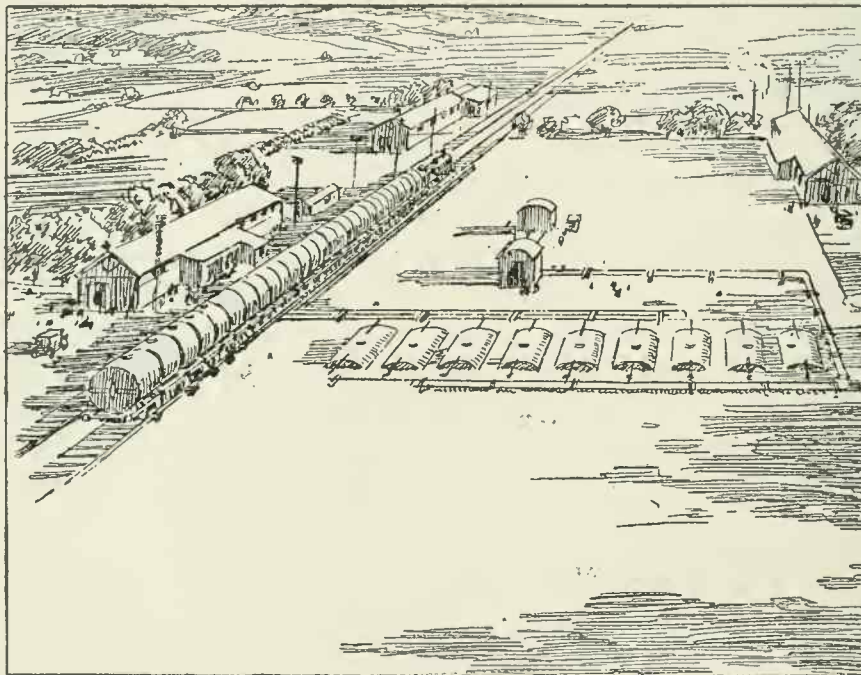


At the beginning of the war, Britain possessed a mere handful of aeroplanes, few with a petrol-tank capacity greater than 25 gallons. At the end of the war her air fleet numbered many thousands, and included machines with *a capacity of 1,400 gallons!*

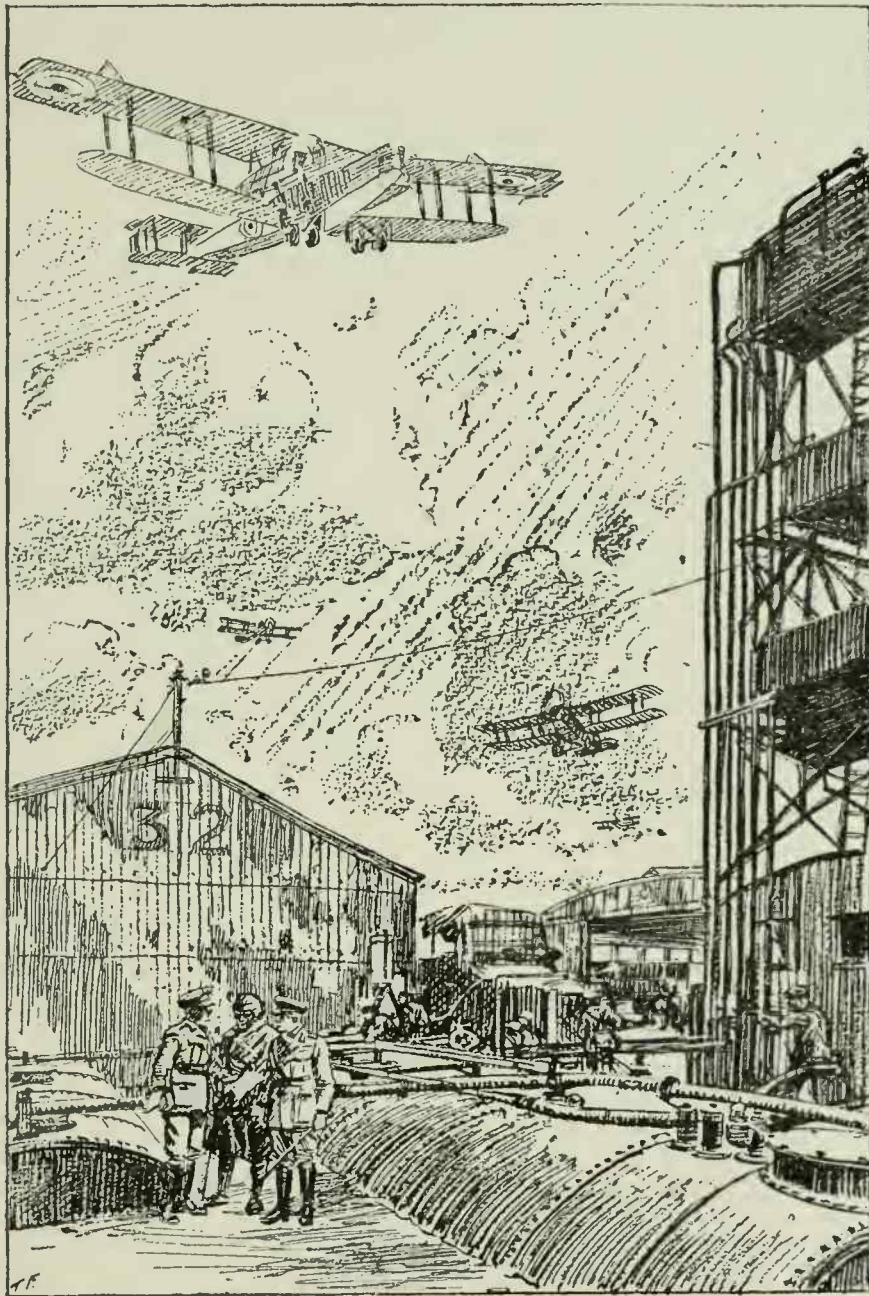
So huge a growth of our air fleet obviously could never have been possible without a complete transformation of fuelling methods. In the early days of the war, petrol was stored in cans at the aerodromes in brick enclosures which in many cases had no covering but were exposed to the elements. From these enclosures the petrol was taken to the dumps at the flight sheds where the petrol was accessible to the men, who helped themselves as supplies were needed. Before the petrol finally reached the tank of the aeroplane these tins had passed through six or seven hands, the petrol sometimes being fetched in hand-carts, in other cases the men going backwards and forwards to the store carrying two or three cans at a time. The consequent waste of man power, especially when a squadron of machines had to be fuelled several times a day and the delivery lorries had to pay repeated visits, may be imagined. The waste

of time was no less serious, since it meant also delay in the general training scheme.

Under the reorganisation of the aerodrome supplies carried out by SHELL at the instance of the War Office, the fuelling of the Allied air fleet was brought to almost an exact science. Storage tank stations were erected within an amazingly short space of time at all the great aerodromes. The filling installation consisted of a series of tanks one above the other, the petrol being pumped through filters into the uppermost tank and gravitating into the charging tanks. From these installations aeroplanes of all types were filled direct without any handling whatever beyond the services of the man standing by, the largest machines taking barely an hour to fill—a contrast indeed with the old method under which it was the usual thing for 20 men to be employed for 8 hours



Railway Tank Train pumping into Pipe-line.



SHELL's transformation of Aviation fuelling methods, enabling one man to do in an hour what formerly took twenty men eight hours to do.



filling one of the modern Handley-Page bombing planes of 900 gallons capacity. Air Board statistics also showed the new system to represent a saving of 10 per cent in the petrol by the elimination of waste ; whilst in point of safety the earlier method bore no comparison.

From the Rouen petrol installation, trains of 30 tank cars, each car having a capacity of upwards of 3,000 gallons, and fitted with the Company's pumping device, kept the aerodrome filling plants, including those of the Independent Air Force, supplied with spirit. Certain of the British aerodrome filling plants were served by pipe-lines connecting them with the railway stations some miles distant, from which points the petrol was pumped from railway tank wagons, thus assuring an ample supply without the delay that would have been occasioned by lorry transit. An instance of this was the highly-important cross-channel aerodrome of Hawkinge, which, on account of its difficulty of approach by road, would have been considerably reduced in efficiency but for its pipe-line which eliminated the $4\frac{1}{2}$ miles distance between aerodrome and railway siding.

SHELL'S Little "Big Push"



LAIN sheets of metal in Fulham today—SHELL cans fighting in France to-morrow! What this, applied to hundreds of thousands of tins, meant in hustle—and *organised* hustle—can be imagined. But it just HAD to be done—the lorries in France HAD to be kept moving if countless precious lives, and maybe even the Allied cause itself, were not to pay the forfeit.

From the beginning of the war to its end, SHELL had one dominating policy—that when the Government made any demand, however great it might be, the Company should never once fail them. This ideal was happily achieved, but not always without very serious difficulty and strain. To make sheets of metal into petrol tins—to test those tins—to paint and dry them—to fill them with SHELL spirit, fasten and seal them—to pack them four in a case—to load them on motor lorries—to drive the lorries to Charing Cross, unload them, and load the trains in waiting at the sidings—and to do all this within twenty-four hours of an emergency call, sometimes for seven or eight successive days and never less than twice a week—could any other organisation in existence have discharged such a task?

These emergency calls began at the time of the tragic retreat from Mons, and were repeated over a period of nearly eighteen months, whenever the Germans made a "big push." On such occasions, the station yard at Charing Cross was cleared of all traffic at eight o'clock in the evening, awaiting the fleet of SHELL lorries. The



SHELL "commandeering" passenger coaches of the Dover Night Express

train—the regular Dover night express with special trucks connected—stood in readiness. With clockwork punctuality the SHELL lorries drove in. A number of voluntary workers from the SHELL staff helped the railway men to load the precious freight on the train, jamming up not merely the special trucks with cases of petrol, but passenger compartments also. When next the reader journeys to Dover in these days of peace, let him reflect that possibly the very compartment he occupies carried SHELL spirit for France in the darkest hours of the world's history.

Ready for the Zepps.

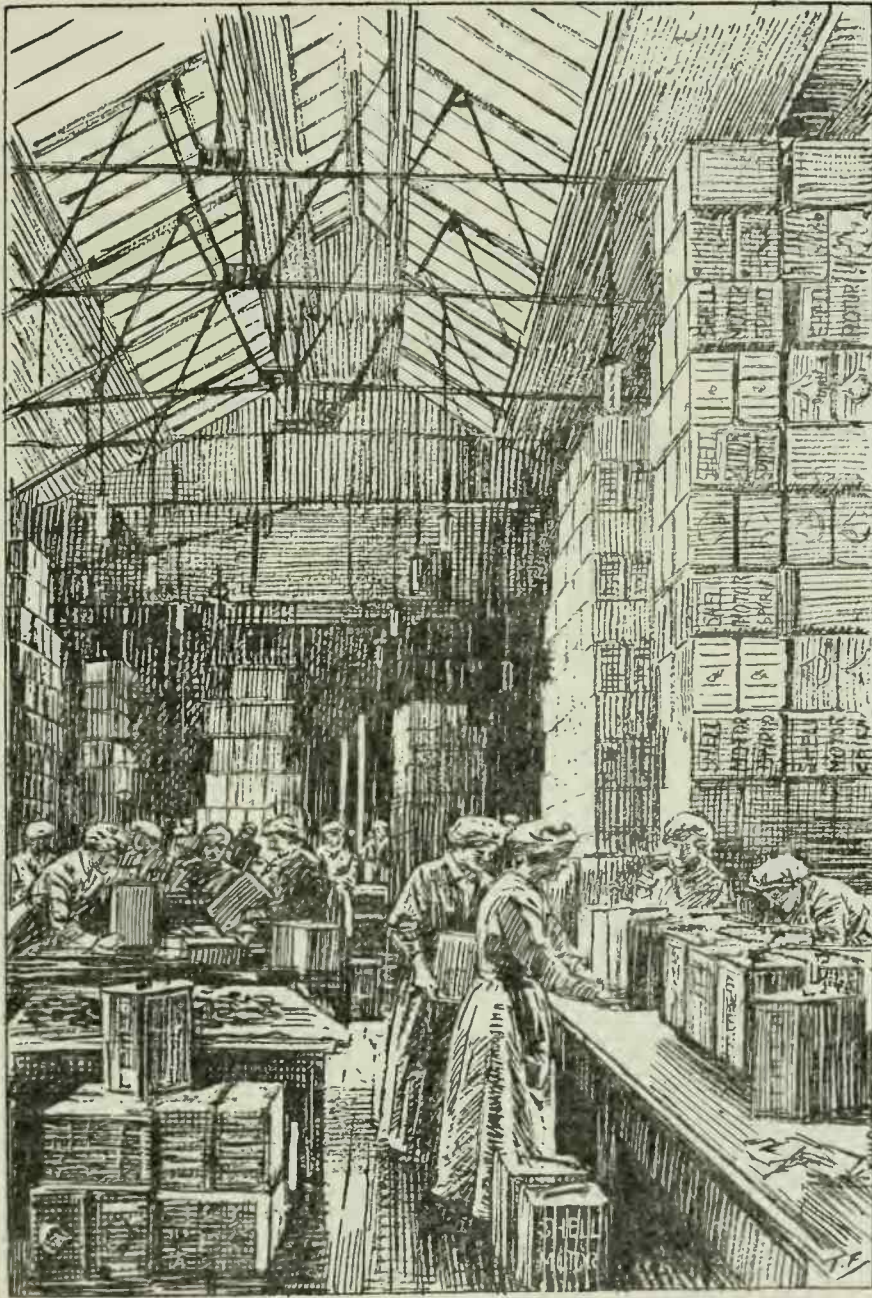
Another SHELL "Push" was on the occasion of the first Zeppelin raid. The warning came with such dramatic suddenness that our air defences were caught with

hopelessly inadequate stores of petrol. That night there left the Fulham depot vast supplies of SHELL spirit for the coast. Not only were these supplies shipped in trucks attached to fast passenger trains, but even special trains were run. The petrol was run into the goods sidings of railway stations as directed, in readiness for collection by the air force lorries at daybreak. Thus was SHELL ready for the Zepps. when they made their appearance.

Tin Hustle

It is only by actually seeing a SHELL tin made in the works at Fulham that one can appreciate what it means to raise a normal daily output of 3,000 cans to a war output of 7,000. The plain sheets of metal have to be stamped out, shaped, joined, reinforced, soldered, and fitted with handle, faucet, and cap ; and although the greater part of this is done by highly ingenious machinery (of which special mention should be made of a particularly clever soldering device invented by a Singapore member of the Staff), it is not a quick process : tins which have to bear so much knocking about as that to which SHELL cans are subjected must be made well, and cannot be rushed.

Even when these operations are completed the tin is not finished. It has to undergo close examination and various tests. Then, if found faultless it is painted—a slow process enough, even when, as in emergencies, the great drying plant is called into service. To gear up the works to more than double the full normal output, therefore, and that with the skilled staff depleted by enlistments, would have been impossible but for the extraordinarily adept way in which the women workers carried out their duties, and the splendid patriotism of the band of volunteers from the Company's headquarters—men who, after a week's strenuous office work, gave up their Saturday afternoons and Sundays to help,



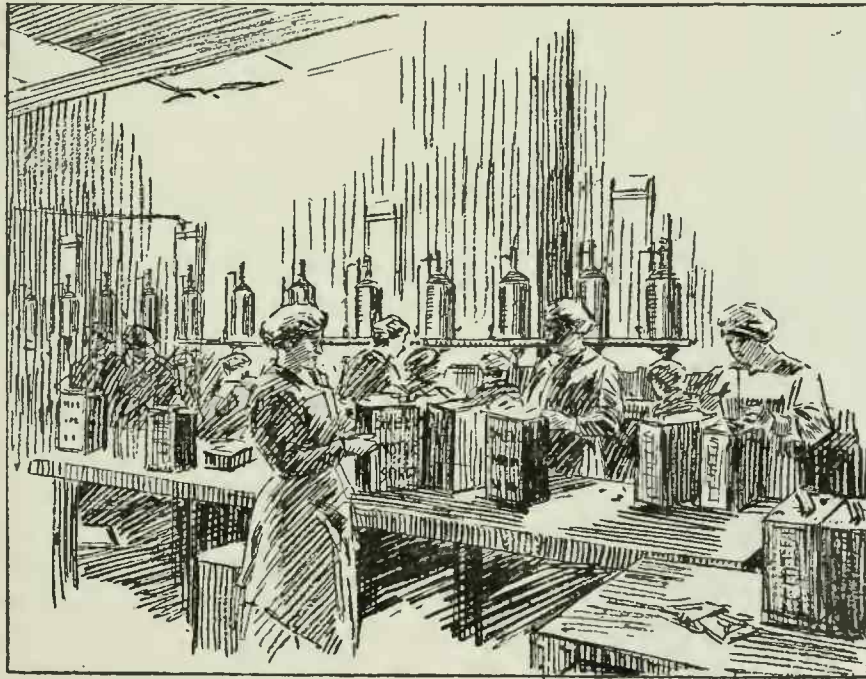
Where SHELL made 5,000,000 Petrol Cans during the War



continuing this unpaid work until the situation was well in hand.

Here at Fulham the huge total of five million petrol cans was reached during the war ! Laid end to end, they would form a " thin red line " stretching from London to Berlin and on to the Polish border ; piled up in a solid column ten yards square they would dwarf Mount Everest itself.

Besides the manufacture of new tins, the Fulham factory was a hospital for old tins, where the bent and battered assumed their original shapeliness ; and it may well be imagined that the war-time " casualties " kept this department drivingly busy. It speaks well for the patriotism of the workers that, notwithstanding the enormous pressure of work put upon them by the repeated " pushes," no detail was scamped, but pre-war excellence was unflinchingly maintained.



A corner of SHELL'S Fulham Can Factory.

The Resourceful Tommy

His Best Friend



HE "bricks" with which, in our childhood days, we used to build everything from a house and a church to a railway station—what these were to us as tiny toddlers, and much more, SHELL tins were to our boys in the various theatres of war.

It would have been a problem to have wandered far in any part of the Western theatre of war, or in Palestine or Macedonia, without coming across the ubiquitous SHELL tin—for their numbers exceeded even the numbers of our troops. As you walked, they were beneath your feet, making the most favoured of footpaths—and there were many miles of such paths in France—or transforming a quagmire into a road passable even by motor lorries. The roof over your head at night was, as likely as not, of SHELL tins flattened out. When at the signal of "take cover!" you sheltered in a dug-out, SHELL tins formed the steps, the wall, the floor, the table, and the seats. Filled with mud, they formed quite cosy huts, many of which are still in occupation by French peasants. In almost every bombarded area of Flanders you found buildings with huge rents made by shells and mended by SHELL cans; and many a Bairnsfather "Old Bill" made "a better 'ole" for himself by the help of his accommodating tins.

With tops removed by the handy jack-knife, they formed fire buckets, waste paper baskets, admirable



A SHELL Footpath

pigeon - holes for stores, or flower pots (for Tommy cherished his flowers very tenderly) ; with one side cut away they served as wash-hand basins, laundry tubs, or handy baths ; with sides perforated, they gave the watchman the grateful warmth of his fire.

Always a cheering sound to the man in the front line at dead of night was the jangle of approaching petrol cans : it meant not only food and drink, but that greatest of all trench comforts, something hot ; for in the morning, Fritz permitting, a fire would be lighted beneath the tin, and the tea, or porridge, or soup it contained would be served all steaming ! This was not a mere incident but a regular practice ; there was no other way of heating anything in the firing line. Sometimes water had to be brought 10 or 12 kilometres ; the fatigue party used nothing but petrol tins for the



Tommy's Handy Writing Desk



The Luxury of a Wash

feather bed in "Blighty" enjoyed a gorgeous night's slumber with a friendly SHELL tin for his pillow! There are thousands of demobilised men who will have to wait a long, long day before they enjoy a meal, be the restaurant never so luxurious, as they enjoyed those little snacks from home, cooked in an opened SHELL tin in a dug-out; and not even champagne, sipped from costly glass, will ever taste so good as did that swig of beer from a petrol can — with perhaps just a flavour of the original SHELL.

At Suvla Bay a tragic situation would have arisen



Hot Breakfast!

purpose. The rum rations also came in the cans.

How many tens of thousands of SHELL cans have gone "over the top" with Tommy, who always believed in taking his rations with him? How many a soldier who one-time slept indifferently on a

but for a lucky supply of SHELL cans, which served to carry drinking water up to the lines. And many are the torpedoed sailors who have been saved by clinging to floating petrol empties.

St. Helen's Court in Khaki

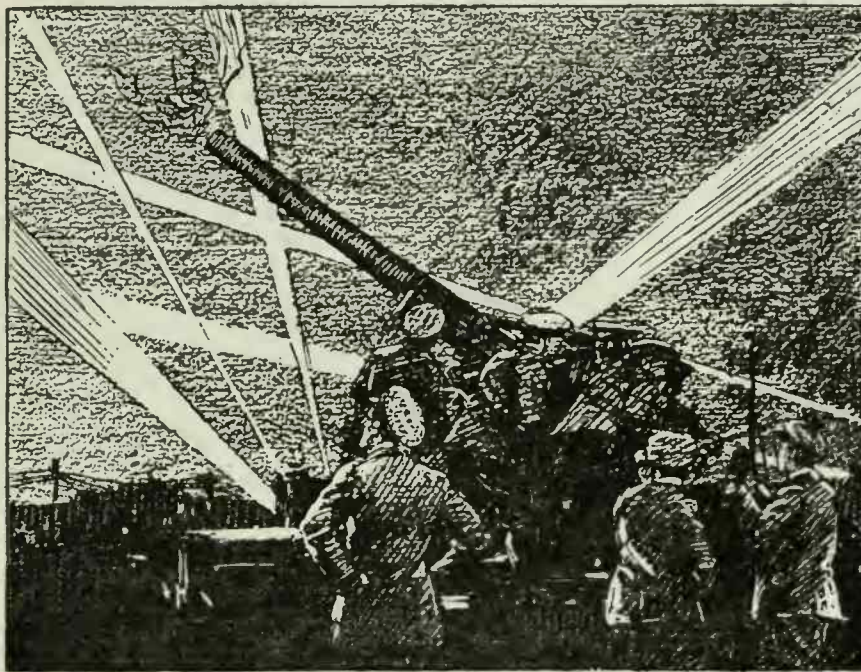


IN those tragic days of August, 1914, when a stunned Europe slowly awoke to a realisation of the catastrophe that had overtaken it, the St. Helen's Court Headquarters of SHELL were amongst the first of all industrial concerns to "put on khaki," and to place unreservedly and disinterestedly at the disposal of the Government, their vast resources throughout the British Empire.

No whit behind the Directors themselves were the SHELL staff, who, from the highest executives of St. Helen's Court and the SHELL Marketing Company to the almost savage natives of Borneo and Sumatra, were untiring in their efforts to help SHELL help to win the war; and in this connection it may be said that even those uncivilised coloured workers of the Far East were remembered in the special armistice bonus distributed by the Directors.

The Company gave every facility and encouragement to members of the staff to join His Majesty's forces. No fewer than 1,050 SHELL men, including the Directors of military age, enlisted with the Allies. These men were not only from the United Kingdom, but also from lands as far apart as America and Egypt, Australia and India, Canada and Africa, New Zealand and China—from every continent of the world, and from almost every country of every continent.

Each man fighting ashore or afloat received a parcel from "home" at least once a month, and every winter

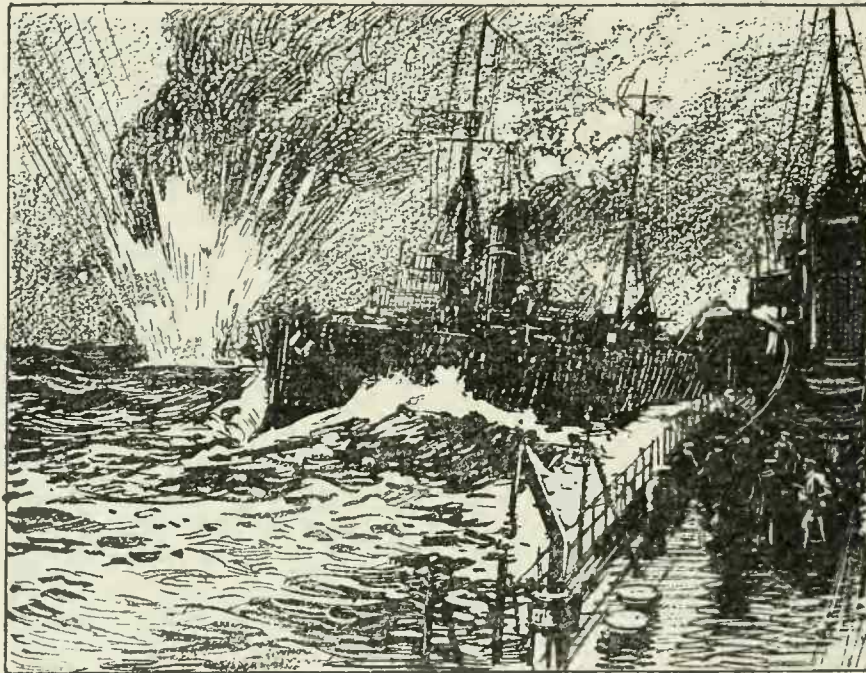


St. Helen's Court Anti-Aircraft Station

a complete outfit of woollen comforts, all gifts of fellow-employees "fighting on the home front."

When Fritz began to pay his nocturnal "flying visits" to London, the dominating roof of St. Helen's Court was one of the first of London's air defence stations to set its guns—officered and manned entirely by members of St. Helen's Court staff—barking at the murderous raiders.

In order to stimulate the production of home-grown foodstuffs, the St. Helen's Court Horticultural Society was formed and affiliated with the Royal Horticultural Society. A highly-successful Exhibition was held in the basement of St. Helen's Court—London City's first underground Horticultural Show—and a number of prizes were awarded. A second Exhibition took place in Manchester. As a direct result of this enterprise, several

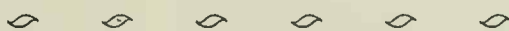


Mine Sweepers at Sea

hundreds of acres were brought under intensive cultivation. All the fruit and vegetables exhibited were sent to the minesweepers, those unsung Viking-hearted souls whose lot throughout the war was second to none in its monotony and ever-present peril. The gifts were acknowledged in most appreciative terms by the Senior Naval Officer of Yarmouth, and by the officers of the minesweepers themselves.

In general, it was impossible that a concern with the world-wide ramifications of SHELL should not suffer in a thousand ways from so universal a catastrophe as the war. The passing of the SHELL Fleet into the Navy auxiliary at Blue-Book rates, and its replacement—so far as replacement was possible—by neutral shipping at four times the cost, represented to the Company a gigantic loss ; but the only sacrifice which occasioned

the Directors any distress was the necessity of temporarily surrendering for national purposes the SHELL trade mark, which has so long stood as the hall mark of excellence in petrol. The indications of gratification, however, with which motorists on the signing of the armistice hailed the prospect of its revival, proved ample recompense for the war-time sacrifice of Quality's familiar emblem.



Early in the war, the policy determined upon by the Company was clearly set forth by the Chairman, Sir Marcus Samuel, Bart., in his address to the shareholders, when he said :

“ I think most of us feel that the duty of helping the national cause transcends and outweighs all other duties. Your Directors have taken the view that no stone should be left unturned in rendering any service which we can to the Allied cause in all parts of the world. . . . We alone of all the great petroleum producers have undertaken to supply large quantities of petrol to the Forces of His Majesty's Government and our Allies at practically pre-war prices. . . . We have been able to render services far outweighing any which any other petroleum concern has been able to render to the national cause.”

Our brief survey of SHELL's work in the war demonstrates the fidelity with which the Company maintained the policy defined ; and evidence that their efforts have been widely appreciated is abundant. From Sir W. Graeme Green, Secretary of the Admiralty, the following official communication was received by the Company's Chairman, Sir Marcus Samuel, Bart. :—

My Lords-Commissioners of the Admiralty, having had before them a statement of the services rendered by you, desire me to signify to you their appreciation of the valuable assistance which has been afforded by you. For the fighting forces it is of the utmost importance at the present time.

As stated on an earlier page, the above high tribute refers in particular to the critical year of 1915, when SHELL produced approximately 80 per cent. of Britain's total output of toluol; and reference has already been made to the declaration of the Commissioner-General of Petroleum in France, M. Bérenger, that but for the output of toluol *the war would have been lost.*

Addressing the Institute of Petroleum Technologists at their Annual Dinner some months after the armistice, Sir Frederick W. Black, K.C.B., referred to the SHELL group as having given the Allies that valuable product, toluol, from Borneo petroleum, without which we could not have defeated the enemy.

"The SHELL Company has deserved well of the country," said Sir Fortesque Flannery, Bart., M.P., "It has served the Navy by the supply of what is absolutely essential to naval operations—the proper quantity and quality of oil fuel. . . . In its action towards the Government and the public during the time of terrible anxiety and trial, it has acted in a thoroughly British way."

"I think," said Sir Montagu Cornish Turner, "that we may look upon this concern as

A National Asset."

Distinctions Gained in the War

By Members of the Company

NAME.	REGIMENT.	DISTINCTIONS GAINED.
ADAMS, CAPT. G. B.	R.F.A.	Military Cross, August, 1917. Mentioned in Des- patches, June, 1918. Bar to Military Cross, July, 1918. Croix de Guerre, July, 1918. D.S.C.
ALLINSON, CAPT. R. L.	Anglo-Saxon Co's Fleet (ss. " Goldmouth ")	
CLAYDON, SGT.-MAJ. W. A.	7th London Regt.	Military Medal
COOK, PTE. A.	889th A.E. Artizan Coy.	Military Medal
COWIE, 2nd LT. G. J. H.	10th Royal Fusiliers	Military Cross
EMBLEY, CAPT. W. F. C.	8th East Surrey	Military Cross
ENGLISH, SGT. H. A.	2/17 London Regt.	D.C.M.
FOOT, LIEUT. S. H.	Tank Corps	D.S.O.
FORD, LIEUT. R. E.	R.F.A.	Military Cross, August, 1918 D.S.O., D.S.C. Belgian Order of Leopold Croix de Guerre D.C.M.
GOW, MAJOR R. W.	R.A.F.	
GREGORY, CORPL. F.	Somerset Light Infantry	D.C.M.
HANDS, SGT. GEO.	L.R.B.	D.C.M.
HARRIS, REGTL. S.M.	R.A.S.C.	M.S.M.
HILL, PTE. A.	889th A. E. Artizan Coy.	Military Medal
HOOK, CAPT. E. T.	Welsh Regt.	Military Cross
INGLIS, GUNNER J.	Royal Navy	D.S.M.
JACOBS, SGT. H.	10th London Regt.	D.C.M.
JAMES, CAPT. W. M. †	London Scottish	Military Medal Military Cross
KAVANAGH, BOMBDR. J.	R.F.A.	Military Medal
LEARY, PTE. W.	R.A.M.C.	Military Medal

NAME.	REGIMENT.	DISTINCTIONS GAINED.
LEGGE, LIEUT. J. D.	Coldstream Guards	Military Cross
MAGINN, CAPT. P. A. C.	London Irish Rifles	Military Cross & Bar
NICHOLLS, CAPT. T. O.	7th Coy. Australian Machine Gun Section.	Military Cross
Oakey, CORPL. E. C.	R.A. and Tank	Military Medal
ROBINSON, MAJOR J. F. M.	1/1 East Riding of Yorks. Yeomanry	Military Cross
ROBINSON, SGT. L. A.	Coldstream Guards	D.C.M.
SALTER, 2ND LT. R. C.	2/20 Batt. London Regt.	Military Cross
SAMUEL, CAPT. WALTER	West Kent Yeomanry	Military Cross
SCOTT, 2ND LT. R. F.	8th Battn. Devonshire Regt.	Military Cross
SHRAGER, CAPT. E. H.	Middlesex Regt.	Military Cross
SUTTON, CAPT. E. J.	R.F.A.	Military Cross & Croix de Guerre
THOMAS, LIEUT. S.	R.F.A.	Croix de Guerre
THOMSON, 2ND A.M. A. L.	R.A.F.	Military Medal & Bar to M.M.
THORNBURY, CORPL. W.	6th London Regt.	Military Medal
TOWNSEND, SGT. A.	R.F.A.	Military Medal
TREASURE, PTE. G. A.	20th London Regt.	1915 Star
TROUSDELL, MAJOR A. J.	Royal Irish Fusiliers	Military Cross January, 1918.
TWYMAN, SUB-LT. J. H.	R.N.R.	D.S.C.
WELSTEAD, SGT. R. A.	H.A.C.	Military Medal

Roll of Honour

“Shell” Men who made the Supreme Sacrifice

NAME.	RANK.	REGIMENT.
BAILEY, T. E. G.	Captain	6th Yorks Regiment
BALDRY, W. G.	2nd Lieutenant	11th Essex Regiment
BARFIELD, N.	Private	Queen's Westminster
BARLOW, C. W.	2nd Officer	The Company's Fleet
BARNES, F.	Private	7th Royal West Kent
BARNES, J.	2nd Lieutenant	7th Notts. & Derby
BARNETT, S.	Private	Queen Victoria Rifles
BARRETT, L.	Private	Rifle Brigade
BENWELL, E. H.	Private	London Rifle Brigade
BIRD, E. H.	Captain	10th Queen's R.W.Surreys
BIRD, R. T.	2nd Officer	Royal Navy
BISHOP, B. B.	2nd Lieutenant	Duke of Cornwall's Light Inf.
BLACK, F.	Private	A.S.C., M.T.
BLACKWELL, A. R.	Lance-Corporal	Duke of Cornwall's Light Inf.
BLYTH, J. R.	2nd Lieutenant	Rifle Brigade
BRITTAIN, F. M.	Private	New Zealand Exped. Force
BUCHANAN, E. F.	Lance-Corporal	Australian Exped. Force
CARTER, G. S.	3rd Officer	The Company's Fleet
CHAMBERS, P.	Private	The Rangers
CHANDLER, P.	Sergeant-Major	Australian Exped. Force
CHARGE, G. C.	Private	Australian Exped. Force
CHRISTMAS, H. L.	Private	Hon. Artillery Company
CLARK, A. D.	Captain	1st Battalion Essex
CLARKE, J. M.	2nd Officer	The Company's Fleet
CORBY, F.	Sergeant	Royal Field Artillery
CORDREY, W.	Lance-Corporal	24th London
COWIE, G. J. H.	2nd Lieutenant	10th Royal Fusiliers
COX, T. R.	Lieutenant	Durham Light Infantry
CROSSWELL, C.	2nd Engineer	The Company's Fleet
DAVIES, H. J.	Captain	The Company's Fleet
DIXON, C. S.	2nd Lieutenant	2/6th London
EASTON, S.	Private	Australian Exped. Force
ELLIS, J. O.	Private	Australian Exped. Force
EMERY, E.	Private	Australian Exped. Force
EVERETT, W. J.	Rifleman	Rifle Brigade
FARMER, L. A.	Lance Corporal	Queen Victoria Rifles

NAME.	RANK.	REGIMENT.
FRASER, P.	Chief Petty Officer	Royal Naval Air Service
FUGEMAN, W. A.	Captain	Royal Fusiliers
FULTON, C. J.	Captain	2nd Battalion Loyal Guernsey Light Infantry
HALLIDAY, V.	Lance-Corporal	King's Royal Rifles
HAZARD, D.	2nd Lieutenant	2nd Middlesex
HERBERT, J. W.	Lieutenant	5th Royal Sussex
HUGHES, E. J. W.	Captain	Machine Gun Corps
JACKSON, B. R.	Captain	Coldstream Guards
JAMES, J. R.	Bugler	Australian Exped. Force
JAMIESON, R.	Private	
JEPSON, A. G.	Captain	1/2 London Regiment
JEPSON, F.	Private	
JOHNSTONE, R. M.	Captain	12th Highland Light Inf.
JONES, W. F.	Private	1st Somersetshire Light Inf.
KELL, A.	C.E.R.A.	Royal Naval Volunteers
KIMMOND, R.M.	Lance-Corporal	Australian Exped. Force
LACHLAN, C. G.	Lieutenant	West Yorkshire
LEATE, W. J. H.	Captain	Lancashire Fusiliers
LESLIE, W. R. N.	Lieutenant	Gloucester Regiment
LISTON, R.	Private	1st Cameron Highlanders
LLOYD, G.	Coy.-Sergt.-Major	4th Battalion East Yorks.
MACKENZIE, C.	Captain	7th King's Liverpool Regt.
MAGINN, P. A. C.	Captain	London Irish Rifles
MANN H. W.	Lieutenant	Loyal North Lancs.
MAVIN, A.	Chief Engineer	The Company's Fleet
McCORMACK, P.	Private	8th Seaforth's
MEDLAND, E. H.	Chief Officer	The Company's Fleet
MEGGEY, D. A.	Signaller	Australian Exped. Force
MILNE, T.	A.B.	H.M.S. "Queen Mary"
MOMPLAIT, A. V.	Private	Australian Exped. Force
MORRIS, G. L.	Private	Australian Exped. Force
MUGRIDGE, G.	Private	Bedford Regiment
MUNRO, J. W.	Private	Essex Regiment
ORAM, J. A.	1st Officer	The Company's Fleet
O'ROURKE, T. G.	Private	Australian Exped. Force
OVERALL, C. B.	Corporal	4th Middlesex
PALMER, H. W.	Sergeant	7th London
PAXTON, E. G.	Lance-Corporal	London Rifle Brigade
PEACOCK, W.	Private	Royal Army Service Corps
PEARCE, E.	Gunner	Royal Garrison Artillery
POCHIN, G. A.	Private	Machine Gun Corps
PUGH, W. M.	4th Engineer	The Company's Fleet
PURSER, H. A.	Gunner	Royal Field Artillery
PYMAN, R. L.	Lieutenant	12th Middlesex
RAE, L. J.	3rd Officer	The Company's Fleet

NAME.	RANK.	REGIMENT.
RAFFRAY, H. L.	Chief Engineer	The Company's Fleet
RAYNER, P. T.	2nd Lieutenant	King's Royal Rifles
RICHARDSON, F. J.	Captain	South Staffordshire Regt.
RUST, P. R.	Private	13th Batt. Kensington Rifles
RUTLEDGE, W. T.	Lieutenant	Royal Air Force
SCOTT, NIGEL	2nd Lieutenant	Royal Flying Corps
SEAMAN, R.	Corporal	Australian Exped. Force
SIMMONS, H. T.	Private	Australian Exped. Force
SIVES J. P.	Lieutenant	Australian Exped. Force
SMALL, A. L.	Corporal	London Rangers
STARR, T. A.	Lieutenant	American Exped. Force
STEVENS, J.	Private	Leicester Regiment
STEVENS, R. N.	4th Engineer	The Company's Fleet
STOTT, E.	Captain	The Company's Fleet
SULLIVAN, W.	2nd Engineer	The Company's Fleet
SWEETLAND, F. J.	Sergeant	Australian Exped. Force
TURNER, A.	Corporal	2nd Batt. Royal Sussex Regt.
WADSWORTH, W. C.	Corporal	17th King's Royal Rifles
WAGGOTT, G. M.	2nd Lieutenant	1/6th Northumberl'd Fusiliers
WALKER, R. J.	Corporal	Australian Exped. Force
WATSON, L.	Private	Australian Exped. Force
WELCH, J.	Captain	The Company's Fleet
WELLS, N. L.	Lieutenant	Loyal North Lancs.
WHITEWRIGHT, A. R.	2nd Lieutenant	Sherwood Foresters
WILLERS, E. W.	Private	Kensington Rifles
WILLIAMS, W. D.	Private	Australian Exped. Force
WILSON, K.	Sergeant	Australian Exped. Force
YOUNG, J. H.	Lieutenant	Royal Naval Reserve









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