entirely right if it had not been possible to find a substitute, for we have no oil fields at home worth speaking about, and ships require to be built for the transport of food and troops; not oil carriage. So, necessity being the mother of invention, a substitute is found in creosote oil, derived from tar. The Navy find it more useful than coal, for not only can they store oil in a smaller space than coal, but it enables them to make longer voyages, and not have to return to port so often to replenish. Moreover, during a battle or a "scrap," the firemen on board can, when ordered, make such a smother of smoke, out of the funnels that it acts as a screen for our vessels and prevents the enemy seeing our boats and obtaining the range for shells or torpedoes at them. The lubricating oil for the engines is largely derived from the distillation of coal.

The Navy wants more oil fuel from home sources, and has offered a prize of £2,000 to the first inventor who can find a means of using tar, or a mixture of tar and oil which will do as well as creosote. If such an inventor turns up, he will not only have the satisfaction of gaining a splendid prize, but he will be placing at the disposal of our Navy, and the Navies of our Allies, an enormous extra volume of fuel oil, and, thus, will be doing

### A MOST PATRIOTIC SERVICE.

He will, moreover, be saving a corresponding amount of raw coal, which can be used in other ways to smash the enemy. Any would-be inventor can apply for particulars to the Controller, Mineral Oil Production Department, Ministry of Munitions, Northumberland-avenue, W.C. 2. The invention must be accomplished within a reasonable time.

The famous "T.N.T.," so universally known, is derived from gasworks and coke-oven works, by taking the very creosote oil just mentioned and washing the coal gas with it. Its chemical name is trinitro-toluol, or, in other words, toluol nitrated three times. No Army or Navy can be without it, as it is the high explosive used in shells of all sizes, in hand grenades, rifle grenades, air bombs, and trench mortars. It is very fortunate that England is such a large coal-producing country, and has such superior quality coal compared to other countries. The public now generally know that the toluol is being taken out of the gas, and are patriotic enough not to mind the fact that the quality is deteriorated, especially when they try to use a flat-flame gas burner. You cannot have the toluol in the gas and defeat the enemy, but the coke-oven works, who do not supply the public with gas, take all the toluol and benzol out of their gas, and the gas when burnt in a flat-flame burner, is absolutely blue and gives no light whatever.

However, curious to relate, the gas in both cases is quite good for incandescent mantle gas burners, as well as for the gas cookers and gas-heating stoves, because the abstraction of the toluol and benzol does not very materially alter the heating value of the gas.

Nearly all the important gasworks in the country wash the toluol and benzol out of their gas, and even some tiny gasworks in the heart of the country have such ingenious managers, who, by taking improvised materials, such as old steam boiler shells, oil drums, and odd pieces of iron piping, have put up most praiseworthy toluol and benzol recovery plants, for, after the cresote oil has been poured several times over the gas, it absorbs the toluol and benzol, but it has to be put through a plant heated by steam or coke to drive off the toluol and benzol vapours from the creosote oil. These vapours are cooled by air or by water, and thus condensed into liquids which are sent to the tar distillery and turned into the famous "T.N.T."

But the majority of little gasworks all over the country are "doing their bit" by washing the coal gas with the very tar they themselves make. The tar absorbs an appreciable amount of toluol, but not nearly so much as creosote oil.

When the country, in 1915, was greatly excited over the shell and explosive shortage, which was placing us and our Allies at a very great disadvantage to our enemy—for Germany had thought the matter out long before the war, and made suitable arrangements—the little gasworks, along with the big ones, buckled to in a very short time. In fact, in a few months most gasworks were "going strong" in the matter of tar-washing, to get toluol for explosives, and thus, together with the shell factories Mr. Lloyd George had erected,

### THE SITUATION WAS SAVED.

Later on, most of the large gasworks, and several of the small ones, greatly increased the output of toluol by washing the gas by creosote oil and recovering the toluol and benzol as described.

Food production is the all important matter for this country now, but few persons credit the wonderful way coal is helping to produce it. When you are told that chemical manures easily double the production of vegetable food from an acre of land, you may be curious to know how the chemical manures now only available are produced. Vegetables or flowers cannot live without a proper supply of nitrogen. Before the war, we used to import large quantities of nitrate or soda from Chile and Germany, in both of which countries there are large natural deposits—especially in Chile. Nitrate of soda contains a fair percentage of nitrogen. Owing to the lack of ships, and being at war with Germany, we cannot now obtain nitrate of soda, except a little from Chile for absolutely necessary use in other chemical manufactures, so we had to fall back on what could be procured at home. Sulphate of ammonia now supplies that want. It is made from coal when distilled, and also when the coal is made into "producer gas" at iron-works and other places, but it principally comes from coke-oven works and gasworks. A little is produced at shale-oil works. Shale is a kind of coal which yields rich oils, including paraffin, but the coke is not useful, and is usually thrown on the "dump" as useless material. Every ton of coal used at a gas or coke-oven works yields about 25 pounds of sulphate of ammonia. Fortunately, sulphate of ammonia, usually known as "sulphate" by the lay mind, is twice as strong in which the poisoned air must be drawn, or else he succumbs. The chamber is filled with a special form of charcoal. That charcoal is chiefly made at gasworks. Wood chips are placed in the gas retort instead of coal.

Every householder will shortly have to decide what amount of the coal allowance he or she will set aside for gas and for electricity, as well as how much raw coal is to be shot into the coal cellar. The matter is left entirely to the householder's option. The householder will, therefore, be dealing as to how far he or she will not only be providing for the protection of the household against a cruel and relentless enemy, such as Germany has proved herself to be, on every occasion, but, collectively, householders will be deciding the fate of this nation and its Allies.

Without all the out-and-out war material, derived from the distillation of coal at gas and coke-oven works, described in this article, this country and its Allies must fail to win the war. The result would be

### TOO HORRIBLE TO CONTEMPLATE.

Think of the fate of Belgium, Russia, Rumania, Montenegro, and Serbia. That would be our fate also if we lose the war. We have got to win it, and every householder can "do his bit" to protect his home and the lives of his dear ones at the front by allowing as much coal as possible to be converted into gas and electricity. Gas, as I have explained at length, is far and away more important that electricity, because of the dozens of useful war materials derived from the distillation of coal at the gasworks, but the electric light works can use coal to better advantage than any householder. The household coal you use in your grates and kitchens contains far and away more explosives, fuel oil for the Navy, chemical manure for food production, dyes, etc., etc., than the coal usually distilled at gasworks, and the coke made from household coal is free from every objection usually raised against gas coke. The coke made from household coal burns exactly like the cinders in your grate after the flames have disappeared. Remember that you can take coke into your cellar instead of coal. The new Coal Rationing Order allows you to take three tons of coke in place of two tons of raw coal. Gasworks generally are very short of coal, and, unless a stock of coal is accumulated during this summer, many of them are bound to fail in their supplies to their consumers next winter. Householders themselves can save the situation by letting as much coal as possible go to the gasworks.

Gasworks and electricity works have no other axe to grind than the battle-axe, to cleave the enemy from head to foot.

I appeal to householders to protect themselves, this nation, and its Allies, by taking as little coal as possible into their coal cellars, and allowing as much as possible to be turned into the urgent war materials described in this article.

(To be Continued Next Week).

## SHOCKING FATALITY IN WIMBLEDON BROADWAY.

### LADY RUN OVER BY MOTOR-VAN.

Wimbledon Broadway was the scene of a distressing accident shortly after half-past two on Wednesday afternoon, the occurrence resulting in the almost instantaneous death of a lady living at 13, Gladstone-road, Wimbledon. It appears that the deceased, whose name is Mrs. Jane Bartley, and who was 41 years of age, was crossing the Broadway in front of the gates at the side of the Town Hall in company with another lady, when, according to a statement made by the latter, the sound of a motor horn caused Mrs. Bartley to hesitate a moment, and although her companion managed to grasp her arm with the object of dragging her into safety, she stepped backwards and was immediately caught by the vehicle, one of the front wheels of which passed over the lower part of her body. The vehicle, a commercial motor-van belonging to Mr. Joseph Smith, house furnisher, of Fife-road, Kingston, was in charge of Thomas Ridgway, of 18, Fairfield North, Kingston, and, so far as can be at present ascertained, the driver did all that was possible to avoid the accident. Dr. Purcell, of Queen's-road, was summoned, but could only pronounce life extinct, and the body was then conveyed to the mortuary to await an inquest.

## "FOUNDER'S DAY" AT ST. JOHN'S HOME.

Founder's Day was celebrated at St. John's Home, Grand Drive, Raynes Park on Tuesday and following days. The festival opened with a little united service of praise and thanksgiving. The Vicar of Merton, who delivered the address and conducted the service, assisted by the Rev. A. S. Jones Jackson (Wesleyan Minister of Mitcham) who also spoke and sang, paid a tribute to the unselfish work of the matron and founder.—The Matron spoke a few words, saying that it was not to her but those who helped her to whom all thanks were due.

Letters of regret at inability to take part in the service owing to previous engagements, were read from the Rev. D. C. Macgregor (Presbyterian Minister of Wimbledon), the Rev. W. Bramley Hart (Wesleyan Minister, Wimbledon), the Rev. Charles Ingrem (Baptist Minister of Wimbledon), the Vicar and assis-