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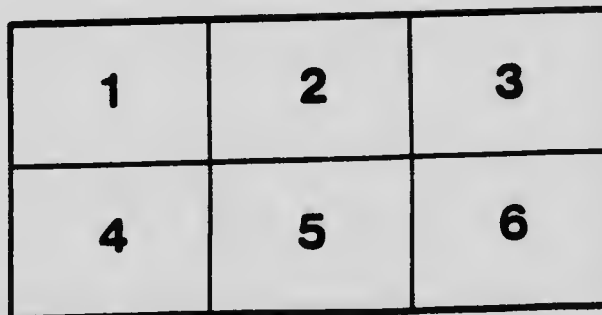
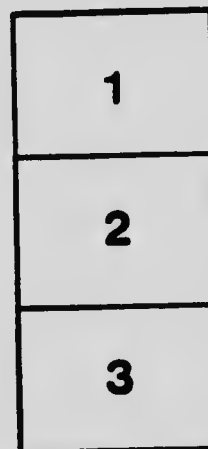
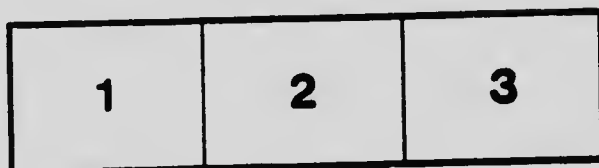
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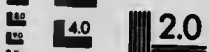
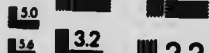
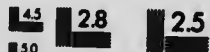
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**DOING THEIR BIT**





# DOING THEIR BIT

WAR WORK AT HOME

BY

BOYD CABLE

*Author of "Between the Lines," "By Blow and Kiss," etc.*

WITH A PREFACE BY THE

RIGHT HON. DAVID LLOYD GEORGE, M.P.

HODDER AND STOUGHTON  
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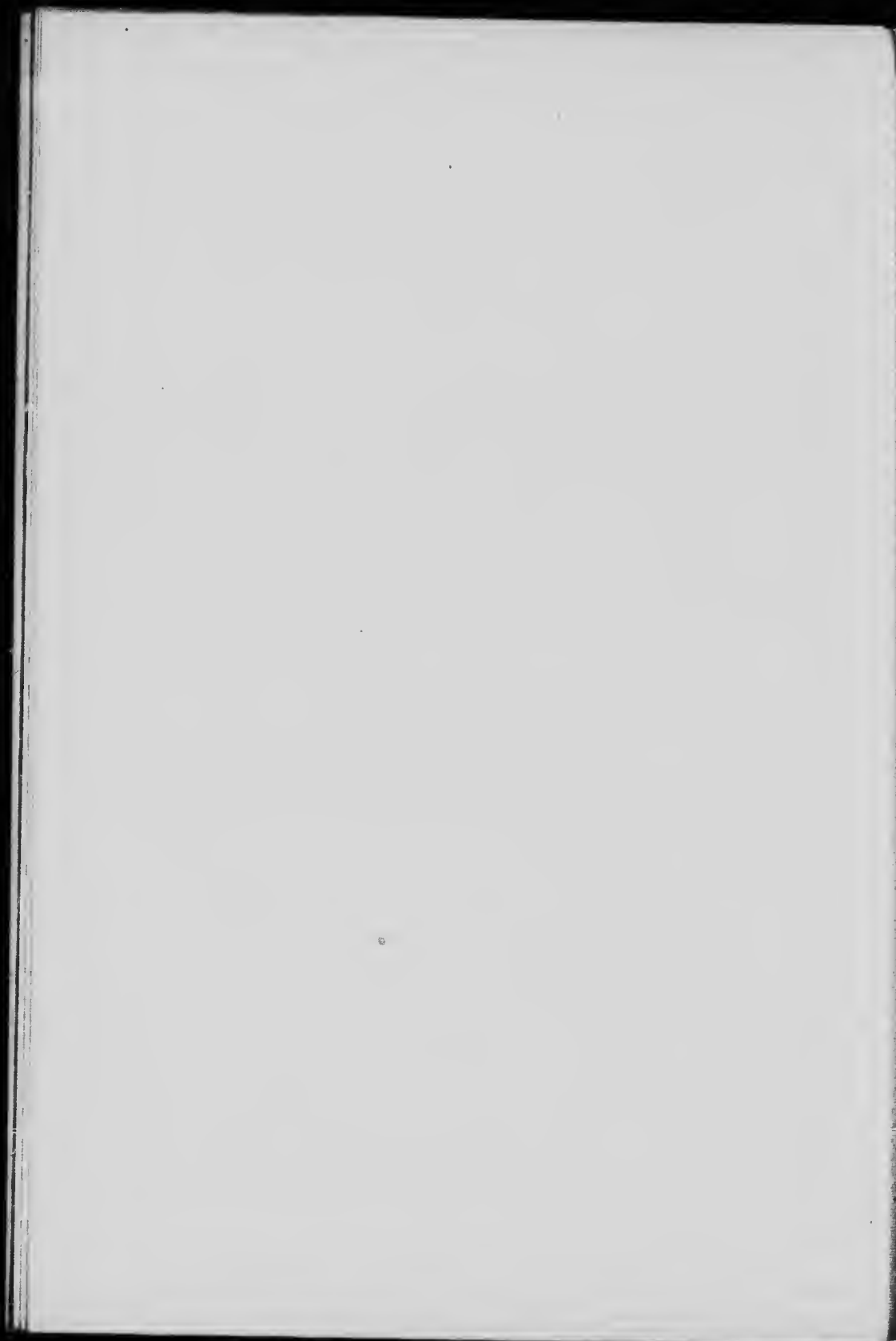
## PREFACE

BY THE

RT. HON. DAVID LLOYD GEORGE, M.P.

I HOPE that Mr. Boyd Cable's book will have a wide circulation, both amongst our troops who will learn from it how their comrades at home are doing "their bit," and amongst the public who will learn from it how great is the industry and devotion of those who are supplying our armies with materials of war.

D. LLOYD GEORGE.



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*It may be well to mention for the better understanding of references to dates, etc., that these chapters were written in December—January, 1915—16, although publication has been delayed for various reasons until now.*

MAY, 1916.

## DOING THEIR BIT

### I

#### WORD TO THE FRONT

WHEN I came here from the Front a couple of months ago I remember looking out from the train and thinking how quiet and normal and peaceful the country looked. Driving from the train through London, the street crowds, although flecked and tinged with khaki, appeared to be going busily or lazily about their ordinary business or laziness, the people were shopping, or walking, or driving in buses or taxis as if they personally had still no more than



a newspaper interest in the war, as if fighting or munition-making were matters concerning a certain section of mankind altogether apart from the ordinary life of the country.

I know better now. My eyes have been opened, and I have seen fully and satisfyingly. There is no fighting here, thanks be, but the khaki that swarms and hives about the outer ways, and only trickles through the big towns, is evidence enough of the fighting material. And even less in evidence, because it does not wear a uniform and because its business is carried on behind closed and carefully guarded doors, the country is sweating at forge and furnace, is juggling with lathes and stamps and presses, has peeled off its coat and set to work in deadly earnest to give the Front the unlimited munitions the Front so long has wanted. It is not given to many to see what actually is being done, and to still

fewer to say what they have seen, and first of all I may explain the why and wherefore of these chapters I am writing on munitions and munition-making. I am aware that very competent journalists have already covered the ground in a series of articles widely published in leading papers, and I am also aware that prominent politicians have made statements as to "increased output" and "controlled factories" and "organisation of industry," and so on. But I am also fully aware that the Front has become exceedingly sceptical of all the facts and figures that have been paraded and of the promises that have been made for a year past. I remember how in the first winter we at the Front looked forward to the spring and listened hopefully to the tales of a flooding tide of munitions that was to help us in the Big Push. I remember how we hung on through the winter enduring the punishment that came to us because of the

shortage of shells, of bombs, of trench-mortars and machine-guns; and I know how grimly the Front stuck out the punishment and hung on stubbornly with a tremendous faith that, come the spring, all would be well, that new armies would be coming along to help carry the weight, that munitions would be pouring out to help us level the long tally. And I know too well the bitter disappointment and the black rage that filled the Front when the spring came and brought us, not a plenty of munitions, but tales of a great shortage, stories of strikers and shirkers, woeful cries of a wasted winter. And when the spring dragged on into summer and the summer crawled past and brought us face to face with the certainty of another winter in the trenches— But these things are past, and, with the Front, I am glad to leave them and let by-gones be by-gones. But it is because of this past that I asked the Ministry of

Munitions to give me an opportunity to see with my own eyes what is being done now, to give me a chance, as one of the Front themselves, to tell the Front as much as I might of what I might see, to let the Front know what I am sure the Front wants to know, what are the munition prospects for the future. The Ministry of Munitions has allowed me to look and to see, to ask questions, to talk with inspectors and managers and workers, to watch the work that is being done, and to figure out what is going to be done. And now I am going to tell the Front as fully as I may what it all amounts to. Some things that I know it would not be wise to tell, I shall not tell ; but that still leaves a lot that I know the Front will be glad to hear. I hope the Front may read these chapters, and I hope the Front will tie a stone to this book and sling it over to any near-enough portion of the Hun lines, because what I have to

write is so very cheerful telling for the Front to hear that it would surely be highly unpleasant for the Germans to digest.

And will the Front as it reads please remember this—that I am not writing to please or displease any person or party in politics, that I am not trying to support or injure the beliefs of any portion of the Press, that at the present time I have no interest in anything beyond the interests of the Front, that, like themselves, I only want to get on and get done with the job, and that my interest in munition-making and its prospects is the main and personal one that is so urgent at the Front—Are we going to get the stuff we want? Are we ever going to be short again?

And here, in a sentence, is the belief I have come to after a wide tour of the munition works: We ARE going to have all we ever hoped for; we are never, never,

never going to be short again. I say this remembering how the size, and therefore the requirements, of the Army have increased, how much vaster in proportion to the increased Army the supplies will have to be to come up to our wants, how our fighting fronts have multiplied and grown, how also some of our Allies are still dependent upon us for some of their munitions. In spite of all these, I believe we are going to get all we want and need, if—it is the only if, although it is in a way a big enough one, and one that I'll come back to presently—if the workers at home play up and play the game and back us up to allow us to play out ours.

If they do that, we are going to have munitions to play about with, we're going to have a heaping plenty of shells and machine-guns and bombs and grenades and planes and trench-mortars.

There are enormous stacks of munitions

ready and waiting now, and they are a mere handful to the munition mountains that are going to come along in ever increasing quantity month by month. You men who clung to your battered and water-logged trenches that winter while the German shells pounded them and you to pieces and our own guns were making a cruelly feeble reply, you gunners who heard the angry demands and the pitiful pleas of the suffering infantry for "retaliation" and a heavier fire and the silencing of this battery or that *minnenwerfer*, and had to smother your savage longing to "let 'em have it" because you were short of shells, you will understand the joy that has lately been mine to stand and look at massed rows and ranks of big fat howitzer shells awaiting shipment, to watch the wide sea of lathes whirling and buzzing, eating up length after length of steel and brass rods, turning out fuse parts and one bit or another of weapons

and projectiles, to hear store managers wonder how or where they are going to house the growing output, to be told, as I have been told time and again, that the factory is running night and day, week in week out, that the present output is to be doubled in the next month or two months, that the full volume will be reached in February or March, April or May, as the case may be. That last was perhaps the most cheery feature of a completely cheering tour—the constant assurance that larger premises were in contemplation or course of construction ; that extra hands were being taken on, or sought, or trained ; that further machinery was on order, or coming in, or being installed ; that present output is only a beginning and is to be added to by half as much again, or to be doubled, or trebled. I didn't have to be satisfied with hearing these things, either ; to be content with the mere telling ;



to be left at the end wondering if it was all a mere vague wish or hope or an empty boast, and doubting whether the spring, like last, would see the hopes squashed and the boasts fallen flat. I had plain enough proof meeting me at every turn that there was a solid and businesslike backing to all the boasts and promises. Here I could see a score of huge lathes with the packing being stripped from about them, there a wide cement floor being spread, new storeys sprouting in a tangle of scaffolding and steel girders on existing works, half-built forges and furnaces rising gaunt from a sea of bricks and mortar and cement. I drove headlong for hours in a fast motor or tramped interminably over wide areas where brick and wood huts and houses and workshops ran, row upon row, township after township, all empty of munition men or machinery, but all clattering and echoing to the saws and hammers of the workers who

drove the job to the quickest possible completion. The promises I got, and that I gladly pass on to the Front, were not only by word of mouth ; they were in solid brick and stone and wood, shining steel and brass and copper, regiments of working carpenters and masons, whole brigades of brawny navvies delving and draining and digging out foundations and laying and levelling engine-room beds and machine-shop floors. I was, in fact, more keen to discover and make sure of what is to be done rather than what has been or is being done, and this because I know, and the Front knows, how we stand out there for munitions now, but not how much lay behind our daily needs, how we are to fare when, or if, all the scattered fronts get busy together, when one big battle is to tread so close on the heels of another that it will be hard to sort out one from the other and issue us the right clasps to our medals.

Well, I confess myself satisfied ; and I've a strong fancy that by next summer the Front is going to be satisfied, and the Germans also are going to be satisfied after quite another fashion. Just now I'm writing about munitions, and I'm not going to wander off into war strategy, or compete with the prophet experts in guessing when the War is going to finish. But, after all I've seen and heard, it is impossible to get away from this happy thought—if last winter and spring and summer we could hold the enemy, could even on occasion beat back a long and desperate assault, break in and grip and stick to a mile or two of country, a few lines of trenches, if we could do what we have done with a small army and a desperate lack of munitions, what are we going to do this year with a fresh and big army, with lavish supplies of every arm and equipment we require, with a flood of munitions pouring in as fast as ever we can

pelt them out? It looks pretty good, doesn't it? And now I'll go on to a general description of some of the proofs I have had of just how good it really looks.

## II

### THE MUNITION MACHINE

I HAVE, I admit, been amazed to see the extent to which the war workshops of the country have grown, the enlargement of existing works, the springing up of entirely new factories, the huge armies busily employed in all these places. But I have been still more astonished—I have been out Front a year, remember, and have lost touch with the country's domestic doings—to find how munition-making has become part and parcel of the national existence; that it is quite a commonplace for Lady This of Tudor Hall or Countess That of Belgravia to be handling a lathe in a work-

## THE MUNITION MACHINE 23

shop alongside Miss So from Kensington and 'Liza Such from Houndsditch ; that it is no more than a matter of course that a man cast for a commission and refused for the ranks a year ago on account of bad eyes has "gone munitioning" and, grime and oil to his weak eye-rims, is driving a donkey engine in a big factory ; that any day you may see at the "canteens" of various factories scores of ladies, who have been used since the day they were born to being waited on hand and foot, now taking the other end of the job and carving mountains of bread into slices and carrying cups of tea and cheerfully waiting on the workers who serve their country in the "shops." I find that the passenger train services have been chopped to pieces, that mails take any old time to do their journey, that goods by rail get there this week, or next, or a month hence—because munition transport blocks the rails ; that whole

industries have been blotted from existence because their hands or their plant were wanted—for munitions ; that Polytechnic classes are being busily taught—to make munitions ; that, in fact, the whole country is one seething munition factory, and no man or lathe or tool that can be turned to munition-making is possibly doing anything else. It may surprise you at the Front, as it certainly did me, to learn that the Ministry of Munitions has taken a grip on the whole industry of this country ; that it has an autocratic control over it, wide and strong beyond the wildest dreams of the craziest autocrat ; that no man can buy or sell a barrow-load of old iron or a sovereign's worth of copper or brass without some official of the Ministry getting to hear of it and popping up to air an insatiable curiosity ; that no lathe or machine for working metal may be imported without the Ministry being given copious explanations

as to its destination and intended use, and, moreover, if that use be not for munition work that the machine or metal is much more likely than not to be commandeered forthwith and set to munitioning ; that no machine may be exported ; that you cannot buy or sell a new or second-hand machine without a permit from the Ministry ; that no man or firm may use man or machine to make clocks or gramophones or motor-cars or anything between if the Ministry prefers the man or firm to turn his factory to making munitions in whole or in part. And all this power is no empty form. It is used to the full, and as a result thousands of machines and scores of thousands of hands have been turned from other work on to munitions. A mechanic may no longer work where and on what job he pleases. If he is running a machine for stamping out trouser-buttons and the Ministry wants him to turn over to stamping out cartridge discs,



he has to do so. If a firm is busy making motor-cars, the Ministry inspector may step in and tell the firm to drop that work and start making shells. If another firm already making munitions is employing daily 100 skilled and 100 unskilled hands, the Ministry will almost certainly take away a number of the skilled hands and hand them over to another factory where skilled men are scarcer and more urgently required. All this simply means that the engineering resources of the country are mobilised and efficiently organised and turned full force on munition-making. The Munition Machine is running now with wonderful smoothness, but it is easy to see what a gigantic task it must have been to get it in running order. It could only have been done with the willing agreement and co-operation of the great engineering and business men and firms throughout the country. You have heard how the Ministry called on local

## THE MUNITION MACHINE 27

business men to organise their districts, to form local committees, and to set themselves to getting the last ounce of munition work out of their districts. Now I am telling you how those committees have done their work, how they and the local Ministry offices and officials have handled the job. But I doubt if ever the country will realise how well it has been done or how much it owes to these people. I have come in contact with many of them in my tour, and I found only one thing greater and more wonderful than their efficiency, and that is their keenness. Obviously and emphatically their whole hearts and souls are in the job. They have in many cases sacrificed their incomes, in every instance I met the whole of their leisure or pleasure or ease to their work. I met one works manager who has not seen his home in daylight for over six months, who has not seen his young children awake in that time, whose normal working

hours have been 6 a.m. to 11 p.m., Saturday, Sunday, and Monday alike. These works owners and managers, and inspectors, and committee-men, and chairmen and secretaries, the brains of the munition business, are amazing and wonderful beyond words. They are the organisers and the driving power behind the whole vast machine, and what that machine is we are going to know more and more fully as the War goes on. I have often in the past heard expressions of wonder that the services of the great business men, the "captains of industry," were not properly employed in the service of their country. That, when one comes to realise the truth, is rather a good joke, because, while people are still grumbling about it not being done, it has been done—has been, quite after the fashion of real business men, very completely done with an entire absence of fuss and feathers and fluster and talk.

Some of the heads of the greatest engineering firms in Great Britain—no, that is very wrong, and I ought to say in the Empire—some of the greatest business brains the Empire owns are running this munition business. In many cases—I believe I might say most cases, but throughout these chapters I am only going to tell of what I have actually and personally seen and known—these men are spending unstinted time and energy on the work, freely and without fee, salary, profit, or reward. Men who have been handling contracts running into millions of pounds, men who have been earning many thousands a year, have dropped all their own affairs to come in on munition work. I can give you one instance out of many I met which will do for a sample. At one place, which I'll describe more fully later on, and which is going to be when complete the greatest munition works in the world, bar none, something

like a score of our greatest contractors are hard at work. They are the sort of men who take on as an ordinary job the tunnelling of the Alps or the Andes, the building of a Forth Bridge, the erection of a street of skyscraper buildings, the building of a Nile barrage. Now they are building roads and huts and power stations and water- and drainage- and lighting-systems, and are driving the work at a furious excess speed to completion. And the Number One, the head-centre bull's-eye boss of the job, is a partner in what I believe is one of the greatest, if not the greatest, contracting firms in the Empire or the world, a firm whose name is a household word, whose activities have spread over all the inhabited and a biggish section of the uninhabited globe, who control capital running well up in the millions and have fingers in all sorts of business pies. About him are gathered a crowd of

## THE MUNITION MACHINE 31

picked men from the four corners of the earth. In the block of offices run up to house the staff and staff work you could probably find a man to speak any civilised or semi-civilised language in the world, and a few who can speak some tongues it would puzzle a University professor to put a name to. They have been hooked in from Chile or Chicago, Sydney or Santiago, from railway surveys in Brazil or oil-fields at Baku, from bridge-building, lumbering, mining, canal-digging, well-boring, tunnelling, from all of the biggest jobs in the Empire or outside of it. And here they are dumped down in a corner of Great Britain, planning, estimating, figuring, tearing up the foundations of the earth and re-shaping it to their own ends and to that one great end, munition-making. The fruits of all their energy and experience and knowledge are sprouting about them and growing visibly under their hands

and eyes day by day and, indeed, hour by hour. They are the power that is driving the machine, the huge machine which is just beginning to speed up, which has not yet properly got into its stride, but which when it does is going to justify to the hilt that verdict on the Old Country that is credited to a Yankee journalist : "Bad starters, but darn good finishers."

But it is not only in the large new or extended factories that the Ministry of Munitions is doing good work ; in fact, I have heard it said that this is the easiest and simplest side of the colossal task. The difficult and intricate part has been the organising of the small business and plants, the converting of all sorts of weird manufacturings into munition-making. I had innumerable instances of this before me wherever I went, but the whole idea was in a fashion epitomised in a drive I was making from one large factory to another. One of

the Ministry's engineers was with me showing me round. Like all his fellows that I met, he was desperately keen on the work, and because I was evidently anxious to hear and to learn he talked munitions without ceasing and poured enough facts and figures over me to stun a census collector. Our car moved on the wet roads at a pace that was just over or under the edge of the safety limit—I discovered afterwards that this is a habit with the drivers of the Ministry cars, and one driver to whom I dropped a casual remark about fast driving explained the habit. "These munition gents I drive never has but the one word for me," he said, "an' that's 'Hurry up!'" My engineer companion was in the midst of a staggering estimate of the rate at which his district's output was growing when the car swung dizzily round a sharp corner, braked hard, and slid guttering under the tail-board of a



huge lorry that lumbered along in the middle of the road. There was a tarpaulin over the wagon, but at the tail of it I caught sight of something that reminded me of long lines of men staggering with heavy burdens into the back-door trenches at Loos.

The car jerked out from behind the wagon, dodged into a gap in the reverse traffic, swooped past, and fled squattering down the wet road. "That's the factory, over there," said the engineer, pointing, "and that chimney-stack beside it is the Blank Tobacco Factory. They're doing shells there now." I expressed some wonder that tobacco manufacture could by any wizardry be converted to shell-making. "Bless you," the engineer chuckled, "that's nothing. I can show you queerer changes than that. You see, our great trouble is to get machines enough and men enough to handle 'em. Shows like motor works

and boilermakers were dead easy and obvious, and they were scooped in the first snap. Then later—quick, look down this lane—at the end!” The car swooped past, and I had one glimpse, as the lane-entrance opened and shut to our passing, of a dingy, grey vista gleaming with wet puddles and with a couple of lorries blocking the far end. “That,” said the engineer, “is the X Y Z Gramophone works. They’re shell-fuses now.” And so as the car buzzed fiercely down straight stretches, or banked steeply and swung skidding and lurching round greasy corners, or checked sharply and crawled hooting hoarsely and impatiently at impeding carts, the engineer discoursed at length on the conversion of this manufactory or that to munitions, and pointed out a late magneto-maker’s, or a piano factory, or a coach-builder’s, describing their past operations and summing up their conversion with “Now they’re pineapple

bombs," or "They're rifle-stocks," or "They're aeroplane frames." I asked him if these firms volunteered for munition work. "Some of them," he said; "but others never dreamed there was any war work they could adapt themselves to." I thought of the tobacco factory and concluded it was small wonder some didn't dream of it. "But I will say," went on the engineer, "as a rule they only want showing, or a hint of a showing, and they get as keen as mustard on it. There was the Rollero Duplicator now. You know what a duplicator is? Thing for printing copies off a typed stencil sheet. Well, they turned over to——" and away he went on another magic-wand conversion tale.

And that is the sort of thing I have been meeting throughout the length and breadth of Great Britain. It isn't only the big firms and factories that are on War work. The little fellows are doing their bit just as

energetically, and if each of their shares is small it must bulk considerably in the total ; and many of them, by devoting all their energy to certain screws or cups or cones, are able to free the large makers of this small work, and leave them to handle other parts and use up the fitments turned in to them. Every scrap of work turned out by every firm or factory is done to gauge, and a screw made in a back room in Bermondsey and another turned at Clydebank will fill and fit a screw-hole bored in a Birmingham shop just as exactly as if the one man or machine had made the lot. But the gauging work is quite a pretty story in itself, though I must leave out its telling in the meantime.

### III

## SUBLIME TO THE—SUBLIME!

THE car had run into the closer traffic of the town, and the engineer was still pointing out various works that had been converted from all trades under the sun to the one and only that counts to-day, when he dropped a remark that roused a fresh current of curiosity. "It isn't only regular business firms that are in on this game, you know," he said. "There's a good story I must get the Eastern district man to tell you, about an old-clo' Jew that wanted to switch his jet-bead machines or something and his horribly sweated bonnet-makers on to war work. He'd have taken on any contract he

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could grab too, from 15-inch shells downwards. But the day's long past when a man can hook a contract on the gamble of subcontracting it out, so our Jew misfired that lot. I rather fancy his bonnet hands are button-holing cartridge-belts or something now, though. But clothing and kit isn't my line, and I don't know the details, and I've plenty of queer conversion cases inside my own job. There's one little place I have now would tickle you. The factory is a top back bedroom in a little side street, the machinery is one knock-kneed, rheumatically lathe, and the factory staff is one old man, although, between ourselves, I believe his old missus takes a turn and keeps the lathe running while he's asleep. The room isn't big enough to hold the lathe and the length of brass rod that feeds into it and turns into a fuse-part, so they've knocked a hole in the wall and the brass rod sticks out through it and works in again through the lathe an

inch at a time. Then there's another little place something after the same style to begin with, but growing a lathe at a time. It's just down the street here, and we pass it presently."

And presently, at my request, the car slowed, sidled cross-traffic, and halted outside the door of an ordinary, rather dingy-looking street-door. When we rang and were admitted we squeezed past the packing-cases that filled the narrow "hall," climbed a steep stair, and were shown into a parlour that might have been transplanted bodily from a Bloomsbury boarding-house. Anything less promising of munition work it would be hard to find, but presently the manager-owner-engineer came along and fetched us to "the works." He was mighty proud of those same works, and small blame to him. He had started with a single lathe and now here he had half a dozen running

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off the power of a tiny engine tucked away in the corner. The lathes had been purchased one at a time as each earned the first instalment to pay for the next, the Ministry encouraging and helping the effort substantially. Now the lathes were hard at work, packed so close that one had to twist sideways to move between them, and bright little scraps of polished metal ranged in rows gave proof of the capability of men and machines and of the organisation and energy that are running through the tiniest of Industry's veins and are going to beat Germany's greatest efforts in the long run. In an empty lumber-room upstairs we were shown a complicated and ingenious machine that represented the former employment of the owner; and pushed away in a corner, dusty and dull and tarnished, neglected and forgotten, were pieces of the work the machine had been



turning out, work which had been dropped completely, and, more than that, which represented a trade and a connection, long and slow in the up-building perhaps, which also had been dropped completely. Here were buttons and belt-clasps and trinkets of silver and enamel and dainty cloisonné work, glowing with all the radiant colours of the rainbow, flecked with inset gleaming gold and delicate silver sprays and tendrils. "Eastern trade mostly," said the proprietor, "India and Egypt and Turkey and so on. The natives like 'em, I suppose."

Natives—yes. But instantly visions came back to me of Arabs chaffering on the deck at Port Said, of the dark and scented interior of a Japanese shop in Singapore, of a native pedlar squatted in the hot sun before the hotel veranda in Sourabaya, and the assurance of the seller, shrill and emphatic to the questioning tourists, "Native work, sah !

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Re-al native work!" And here in a back attic in England—I daresay the proprietor wondered why I grinned at his pretty trinkets and his big machine.

And then as we clumped down the stairs and into the street again the engineer made a remark that I must go back a little to make understandable. "Rather a case of 'the sublime to the ridiculous,' isn't it?" he said, and in that he was referring to the works we had been over that morning and had just left. I had been shown these as a good sample of what a "converted" works could do. In pre-War days the firm were makers of a certain part of railway locomotives. They were entirely specialists in this work, and employed many specialist hands and a vast amount of specialist machinery on it. But now the whole of their locomotive work has been set aside, and the whole energy of the shops is turned on to war work. Some of the old machines, lathes,

and so on had been ingeniously adapted by the making and fitting of new tools to their new work, and other new munition machinery has been introduced wholesale. We walked through huge rooms filled with heavy lathes, grinding, scraping, and screaming on the boring and turning of blocks of steel that were growing swiftly under our eyes to the familiar shape and semblance of shells. We followed the rough steel billets through all their processes, the shaping and smoothing of outside and inside, the grooving of the base to take the copper driving band, the cunning scoring out of a "wave line" in the groove, the fitting on of the copper band and its clutching in a giant steel-fingered closing and opening hand that squeezed the copper inexorably into its place and tightly into the "wave line," there to grip and prevent it slipping under the terrific wrench and spin the rifled gun would give it. This "banding press" was

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a new machine just installed and putting through its first shells while we were there. It was merely another word in the same story I have heard throughout the munition works. "It will speed up the output a good deal," said the manager complacently as we watched. "We'll be doing another so-and-so per cent. when it's running." In another vast chamber we saw "pineapple bombs" or hand grenades being made—"pineapple" being a neat description of the shape and criss-cross pattern of lines marking the segments into which the grenade bursts. In the foundry the floor was covered with rows upon rows of square-shaped, dark-grey boxes, and with other square boxes bearing what looked like the impressions of small dumb-bells. Men were busy about these boxes, the moulds for the casting of the bombs, and at one end of the room other men were tapping and prodding at an up-ended boiler-looking arrangement.

From this, when the clay stopper had been knocked out, a jet of molten metal shot in a glowing, pinky-red stream running like water from a tap into the heavy bucket in place to receive it. When the bucket filled, a fresh plug of clay stopped off the stream, and instantly the bucket swung off, swaying in the grasp of chains and hooks that ran on overhead rails to the waiting moulds. The bucket checked and tilted at each mould and the liquid metal poured smoothly into its appointed place until the bucket was empty. After the rooms where the lathes rumbled and roared, and the riven steel grated and squealed under the cutting tools, and the hammers jarred and pounded incessantly, this foundry was strangely un-noisy ; but here, as in all the other rooms, there was the same sense of bustle, of rush, of speed, of driving the work ; and the spurting jet of hot metal, the glow of the furnace, the dull roar of the fire, the hoarse blowing of air through a

nozzle where the moulds were being blown clear and clean of dust and sand, the clink and rattle of tools, the movements of the stripped and sweating workers—all gave their own sure impression of haste and activity. “Thirty thousand a day we’re turning out of these,” said the manager, “and we’ll better that presently.” Now, you bombers of the “Suicide Clubs” might note this—30,000 grenades a day are being turned out by this one firm, a firm which only devotes a part of its work to grenades. This is only one firm out of many I have seen, and very many more, no doubt, I haven’t seen, and one particular make of the many makes you out Front know are being made. Does it give you any realisation of the number of grenades you will be getting presently? I hope so. I hope you will understand and be sure that never again will you be “bombed out” of a captured trench because your supplies of grenades ran out. And I

hope Herr Fritz across the way in the front trench also understands and appreciates the prospect.

From the foundry we passed back into the workshops, picking a way round and past and between stacks and piles of shells in every stage of roughness and completeness; we climbed stairs, wandered over many more floors, and many acres of man- and machine-filled rooms, and came at last to one large, empty room. In it there were machines in plenty, but no man or woman. The walls echoed emptily to our steps and voices, the machines were still and silent, dust-covered, dingy, forlorn, and abandoned; and piled in the corners, on and under the benches, anywhere out of the way, were heaps of the locomotive parts on which the firm was once solely engaged. There were many thousands of pounds' worth of these parts and of machinery standing idle, and one might have expected the sight and the

thought of all his own diverted specialist knowledge and experience to have brought sadness and melancholy to the mind of any manager. But here the manager had evidently no regrets and no time to waste on memories. "We couldn't adapt any of this machinery," he said lightly, "so we're going to clear it out, and fill this place up with new shell-making plant." But, after all, that sentence only summarises the whole scheme of this munition business. The man or the machine that cannot or will not be adapted to war work is ruthlessly cleared out and replaced by man or machine that can. It is to the everlasting credit of the men that so many of their machines have been cleverly adapted, that so few of themselves could not be, and that still fewer—if any—would not.

The factory was knocking off for dinner as we came away, and the car ploughed out



through a hurrying crowd at the main gate and down a dividing sea of workers in the road outside.

So now you will understand—to come back to where I broke off at the street-door of the humble workshop of the one-time maker of enamel buttons and “re-al native work”—what was in my engineer’s mind when he made that side remark: “Rather a case of ‘the sublime to the ridiculous,’ isn’t it?”

But it doesn’t altogether strike me that way. After all, the trinket-maker upstairs was “doing his bit” to the best of his ability, just as the manager in the locomotive works was doing his. When you think of it, there is something rather fine in that single-track footy little business cheerfully climbing out of its established groove and plunging off along the new and unknown path of war work. If we take the trinket-maker, and that other old man and his wife

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with their brass rod sticking out through a hole in the wall, as samples and specimens of the spirit that is animating the Empire and its workers to-day, it is a thing to be mightily and devoutly thankful for. It is not, if you look at it aright—the huge humming locomotive works and the sometime button-maker—any case of “the sublime to the ridiculous.” I am not sure, in fact, that it is not rather The Sublime to the More Sublime.

## IV

### SHELLS AND MORE SHELLS

IT would be impossible for me to describe in detail all the factories I was able to see, but in many of them I gleaned particulars which show plainly the way that war work is being pushed through. I suppose that if there is any one branch of munitions which the Front wants to hear about it is the output of shells. Shells and guns count for so much nowadays, a devastating artillery fire so eases the work of the attack, a heavier opposing fire is so appallingly destructive to an advance, the whole moral and physical effect of a superior artillery is so great, that I know well how very welcome a word it

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will be to the Front that shells of every size, weight, and calibre are pouring out from the factories in a stream already tremendous, but not yet nearly at its full volume.

One of the most inspiriting sights I saw on my tour was in the foundry of a shell factory where the rough forgings were being put through the first stages of their progress to completed six- and eight-inch shells. The foundry was a vast place, with chinks of vivid light glowing through the row of furnace-doors and lighting the hot gloom, the vaporous film of smoke and steam, the bulky machinery looming dimly through the half-dark, the hurrying figures of the workmen. A furnace-door slams open, and a burst of glaring light glows fiercely over the shop; long irons plunge into the flaming gap, and poke and prod and hook hastily about the fire; a lump of glowing steel rolls out, tips over, and thumps down on the inclined floor in front of the furnace.

There is a babel of yells, the rush of flying feet, the clatter of a truck-barrow, and the red-hot billet of metal is pounced upon, snatched, and twisted on to the hand truck, rushed to where men wait its coming grouped about a lumbering press whose massive bulk towers aloft into the misty gloom. The hot metal is clutched and jerked into position under the heavy punch, and instantly the machine, with a gigantic hissing sigh, moves and thrusts downward a smooth-moving but irresistible punch. A gush of flame and burst of thick black smoke leaps upward and vanishes swiftly, the punch presses home, stops, reverses, pulls up and out again. The machine breathes another steamy sigh, twists the first punch aside, poises another an instant over the red, glowing metal, and again thrusts, plunging down upon it. One after another the full set of punches take their turn and squeeze and press their shape upon the

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plastic steel. Then the last punch draws out, and two men jabbing with long levers hook out the metal, still glowing hot but transformed in these few seconds from a rough round block to a hollow cylinder; chained pincers grab the cylinder and swing it rapidly to the drawing-press, where the tough steel is pulled out like putty and drawn to its required size. When it has worked its will the drawing-press disgorges the cylinder, cooled now to a deeper hot rose-red, tumbles it out on the floor, and waits ready for its next mouthful, while men trundle and roll the hot cylinder across the floor to rest and cool beside the long row that lies fading off from rose to blood-red, to darker and duller crimson, and through deeper and darker shades to cold grey and black. And as the punches were jabbing at the one hot billet another was falling from the furnace, and another was being worked in the draw-press, or

rolling from it rapidly across the floor to the cooling place. Several gangs of men, several punches and presses, were all working at a top pressure of speed ; the foundry was filled with the roar and rumbling and hissing sighs of the machinery, the clatter of trucks, and clank of levers and chains and pincers, the thump and thud and roll of the falling and moving billets, and every now and then the outburst and clamour of shouting voices, the swift rush of hurrying feet. The opening and closing doors of the furnaces, the fierce glow of the fires, and the white- or red-hot steel billets, the spouting gush of flames and sparks from the first thrust of the punches, threw in turn a mantle of searing golden light, of radiant orange, of dusky red, on the gleaming machinery, the running figures of the men, their thrusting and pulling arms, heaving, jerking shoulders, wet, glistening faces, shining, white-glinting eyes and teeth. The foundry was palpitating

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and alive, humming and trembling, panting and quivering, with savage, incessant haste, with sweating, driving energy, with a splendid and ordered virility. It did one's heart good to stand there and watch billet after billet thud down from the furnace to the floor, to see the giant machinery beat and squeeze them into shape, to hear the calling and shouting, to sense the stir, the whirling rush and drive of the work. And "drive" was the key-word of the whole factory, as I found it is of most munition factories. Here, again, the manager who showed me round was most openly anxious to get the last possible ounce of output from his plant, and to add and add and keep on adding to plant and output. Every process of the work is under constant scrutiny, and every possible time- or labour-saving device has only to be tried and proved to be instantly adopted. Here I was shown under construction a new plant for cleaning out



the finished shell ; there a newly installed arrangement for the quick and even painting of the shells by air-brush spray ; everywhere throughout the works similar dodges for cutting down the time and labour, for speeding up the output. And always remember that in war work cutting down time and labour does not, most emphatically does not, mean reducing the working hours or the number of hands. It only means finding time for more work, freeing hands to turn on to more work again. Anything that will save skilled labour especially, will allow the experienced engineers to "go round" a little better, spread over the unskilled hands a little more, is hailed as a godsend. In this particular factory there are 2,000 hands—I should say were, because that is some weeks ago now, and many changes come in a few weeks' munition work these days—2,000 hands, and of these there were only sixty men who were engineers,

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were skilled men. I asked what was the proportion amongst those men I had watched grabbing and slinging about the white-hot billets, handling them and the huge power machines so smoothly and skilfully. "Those," said the manager simply, "were all unskilled no more than a matter of months ago. Milkmen, and market gardeners, and carters, and all sorts they were, red-raw new to the job, and never inside a shop or handled a tool till they came in here." It seemed incredible, but I found plenty of similar instances since, and the munitions engineer who was going round with me assured me these things are the rule rather than the exception. So apparently war work is not only making shell factories out of sewing-machine and tobacco works, munition contractors out of enamel-button makers, munition machines from bicycle-and clock-factory lathes, but is also manufacturing as a by-product engineers

and mechanics from milkmen and all sorts of similar unlikely material. This manager had the same old story to tell of increasing plant and hands and output. I stumbled over a litter of planks and bricks and mortar and building material outside this factory, just as I have outside many others, and saw the half-built furnaces and half-laid concrete engine-beds, and listened to the tally of the work under construction and the machines on order or delivery, and the increase of output that would result. This factory is doing six- and eight-inch shells mainly, but the same increased-output programme belongs to every other make in every shell factory I saw. One place is almost ready to commence delivery of some hundreds of twelve-inch shells per week as a new addition to their present output of many thousands of eight-inch shells and forgings of six-inch shells per week, as well as completing a portion of the

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six-inch. I saw at this place piles of new lathes and motors waiting to be erected, and saw the new shops that have used up 4,000 additional new hands.

Another factory commenced building a six-acre shell factory in June, is now employing 1,600 hands, and increasing them to 2,500 as quickly as possible. At another place the present factory, covering many acres, crammed to the doorstep with machinery and workers, stands on a site which before the war was an open green field. Now it employs 6,500 hands and is adding about 200 hands a week. Yet another place was an empty and idle building in July—in all these months mentioned I refer to the year 1915—but now it is turning out 5,000 shells a week, and it is to reach 20,000 a week within the next few months. All these are merely instances, picked at random from my notes. I could multiply them, and in every district I visited

the local Munitions office could, if they were permitted, have given me figures and dates of this kind almost without end.

Before I finish this chapter I must pass along a message that the workers at a certain national shell factory gave me for the men at the Front. I had been telling the general manager how good it was to see the stacks of shells, the ceaseless flood that was running through the works, to hear all he had been telling me of the progress made, and still more of the further progress to be made, and I was led on to tell him something of the heart-breaking shortage of shells we had known a year ago, the punishment the troops had suffered again and again from the heavy artillery fire of the Germans, and the slow and grudging reply that was all we could make. The manager asked me would I talk to some of their shop foremen and tell them what a shortage of shells meant to the Front. So he called in about a score or more of his

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men and I just talked to them, and told them how the Front was hanging on the efforts of the war workers at home. I told them of that winter in the trenches, of the hopes we had held to of plenteous supplies of shells in the spring, of the blow it was to us to hear of as great a shortage as ever, and, still worse, of the squabbling amongst munition workers and their hagglng over 8*d.* or 8½*d.* an hour pay, or Saturday half-holidays, or double overtime for Sunday, while the men in the trenches suffered a hell of shell-fire, and soaked in knee-deep gutters, and lost their limbs and lives from frost-bite, and put in six or sixteen-day spells, as need be, with no half-holiday and a shilling a day pay for time and overtime. Maybe there was no special point in my telling these particular things to these particular men, because, as their manager assured me, that factory was doing and always had done its level best, and there had been no friction or slacking what-

ever in any department. But anyhow I told them, and I told them the Front was hoping again for a flood of unlimited shells this spring, for the essential wherewithal to break the lock-fast lines in the West, for the munitions that would at last give us a fair fighting chance—the more than which we don't want, and don't need, to give us victory. And the men heard me out, and after I came away it appears that these foremen and charge hands went back to their shops and told their men what I had said, and by and by their manager sent me a resolution and a pledge they had passed and signed. When I think of the ring of earnest faces that surrounded me as I talked, of the group of figures in their oil-stained overalls in the office built over the workshop where the lathes and hammers and punches and presses around and underneath us sang their ceaseless song of Shells and Shells and more Shells, I feel that this is a resolution

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to be fulfilled to the hilt, a pledge to be carried out to the last shrapnel bullet. And here I give you their message, leaving out only the name of the factory and the names signed at the end :—

“ DEAR SIR, — We, the managers, foremen, and charge hands of the above factory, who listened with grave interest and concern to your description of our brave lads fighting in France and Flanders, and the hardships they have to endure, due in lots of cases to lack of shell, desire to place on record our thanks to you (who have been through the mill) for putting the matter so clearly before us. We also pledge ourselves, and desire you to inform our lads at the Front, that, so far as we are concerned at the — National Munitions Factory, we are working diligently, harmoniously, and sticking it, and will continue to stick it, with the one object of getting out of the



above factory *Every Possible Shell*. We trust that our rapidly increasing output in shell will help to fill those empty limbers you mentioned so feelingly in your remarks.—With kind regards, we are, dear Sir, yours very sincerely.”

That, I know, is the heartening sort of message you want to hear out Front, and it expresses, only more clearly and emphatically, what I have heard from other shell-makers throughout the Kingdom. “Every possible shell!” Think what it means, you at the Front. And you think of it too, Fritz Boche.

## V

### THE WOMEN

EVER since I commenced my tour of the war works I have been developing a most whole-hearted admiration for the women workers, and the Front may "spring smartly to attention" and give them the full "Present arms!" salute for the way they are buckling down to their job. This applies to women of all grades and classes too. I read in a local paper the other day a brief paragraph about a presentation made by fellow-students to a girl who has apparently dropped her college career, taken a course of instruction in munition work, and had just been given a berth in a large

works in a munition city. Lady S—— (the widow of a brave man whose name is a "household word" throughout the Empire) is working in a munition factory, her title and position unknown to her workmates. If she drew wages according to her value, she would be getting many pounds where she gets shillings, because she has by constant talks with her workmates impressed upon them and explained to them that they are working for far more than a weekly wage, that they are backing up their men out Front, are saving British lives, are helping their fighting men to beat the Germans, are themselves fighting and racing the German workshops for the prize of final victory. The result of all her explaining is recorded in plain figures in that workroom's output, in the increase of 30 per cent. the figures show. I met by chance at a restaurant lunch-table the other day a girl obviously of gentle birth and up-

bringing. She left the table at five minutes to the hour to be back to the factory when the whistle blew, and before she went she paid for her lunch about, I should estimate, as much as she would earn for her full day's work. My being in uniform led her to ask a question and to tell about a brother at the Front and briefly what she has done and is doing—helping in the delivery of Derby "pink paper" forms, working in a soldier's free buffet, making Red Cross supplies, and now, because she believed it to be the most useful and urgent, munition work. She starts work at 6 a.m. sharp every morning, she puts in some eighty hours' work a week, and is openly proud of the fact that she has not "missed a quarter" on any day since she started. I am mentioning these instances, not for the honour and glory of any individual or any class, but merely to make it plain that many women are in munition works, not from any need or wish

for pay, but solely and simply because "King and Country need them." I have been told, when looking at a room filled with hundreds of women workers, that they represented every sort of class and occupation, and that every one of them was new to the workshops. There were ex-typists, milliners, cooks, housemaids, students, charwomen, theatre attendants, many wives and sisters of soldiers, many girls and women "of independent means."

And their work is good, is, according to the opinion of every works manager I asked, excellent beyond expectation. One manager had no words sufficiently warm to praise. "Knock bottom oot o' t' men," he said emphatically and repeatedly. At this particular factory women were doing the whole work of making 18-pounder shells. One girl, who a few months ago had never seen a lathe outside a picture-book, is turning the copper driving bands and does 250 bands

each ten-hour shift—and that, I am told, is up to or over a good man's average. These bands have to be pressed by a "banding press" on to the shells, and a girl puts 500 an hour through the machine. Now, without describing the operation in detail, this means that the girl lifts a shell from beside her, places it in the machine, where it gets a first squeeze, lifts it an inch or so and twists it round for a second squeeze, and lifts it out of the machine on to a table-shelf beside it. She does the three lifts—in, and twist, and out—500 times per hour, 5,000 times a day. That is no light physical feat, and it speaks volumes for the energy and the close attention paid, without a halt or break, to her work. There are no men in that factory except a handful of skilled engineers who are kept employed on tool-making and setting, sharpening cutters, erecting machinery, and other work that only skilled men can do. There is one room

full of these men—The Room of the Old Men, I called it—that I want to tell you about presently. It is a tale to be proud of. For the most part the women workers I have seen were on lighter work—shell-fuses, rifle cartridges, filling or charging, gauging—but this manager assured me there was no doubt about the women's ability to handle anything up to the 18-pounder shell (I saw some on the heavier 4.5 shells later in another place), showed me how and where his women loaded shells from the store into the trucks on the railway siding by hand, and lifted out and up and in, and packed and stowed eight tons an hour. And, finally, he boasted with honest and legitimate pride that his girls did at least as good and, on official figures, cheaper shells than any other factory in the kingdom. And the output is to be exactly quadrupled within a few weeks—not “may be,” or “hoped to be,” mark you, but, on

cut-and-dried, certain, and deliberate plans, *will* be.

At another factory I stood in a glass-sided passage and looked out over a vast shop blazing with light, humming with belts and machinery, packed with lathes and their women workers, brilliant with the vivid colouring of the flags—Union Jacks and Standards—that were hoisted proudly over the head of each girl and her machine. The girls were in khaki overalls and caps, and the massed colours of the khaki, of the Allied flags' scarlet and blue and white and orange and black, the glistening steely-blue of the machinery, the warm touches of the red copper and yellow brass, all under the bright glow of the electrics, all jostling and astir and quivering with life and animated movement, made up a picture as thrilling and alive and heart-warming as any I have seen throughout the war works. This is a brand-new factory—shops, machinery, and



hands all collected and built from the foundations up since the war. There is no exact maximum output in view there, apparently. It is simply growing as fast as new shops can be built, machinery installed, hands found and taught and employed. There are 7,000 girls at work there now; they average  $87\frac{1}{2}$  hours' work a week, and they are "as keen as razors, as steady as rocks, as regular and reliable as the factory hooter."

Some of the work I have watched the women on is light and might properly be described as women's work. In one place, for instance, there is a long row of girls sitting over a bench under the blaze of electric lamps. They were piecing together four tiny scraps of metal which at the end of the bench are being fused into one, making one whole fuse-part which when complete is about the size of a sixpence and the thickness of two pennies. One of the four pieces

of metal is about as flimsy as a clipping from a lady's little finger-nail. How exactly the fitting and brazing or soldering must be done was very clearly proved by a box full of these particular fuse-parts that was shown me. There were 40,000 of these completed parts and they were all "scrapped" as useless because through a mistake in the making of one of the gauges they were wrong by half a thousandth of an inch. It is hard to find a comparison which adequately conveys the meaning of  $\frac{1}{2}$  a 1,000th. Perhaps the nearest would be a fine hair-line, the up-stroke of a pen. In this same works—they were originally telephone-makers, although now the original place is swamped in newly risen workshops—a large room is filled with girls gauging or measuring the various finished parts, just as in other factories I saw thousands of girls similarly engaged on all sorts and descriptions of parts from shell bodies downwards. The method of gauging

is, roughly, that a girl has two gauges on which to work, a "go" and a "won't go." One girl gauges a part for length, say, another for width, another for depth, and if in any of these operations the part "won't go," won't pass through the gauge where it should "go" or does go through the under-size or "won't go" gauge, that part is immediately outcast and returned for alteration or to the melting-pot. In this factory there are something like 30,000 fuses on the move flowing through the works, and on each fuse and its parts there are about a hundred gaugings to be done. At another place—a motor works in pre-War days—I was told that no girl had been employed by the firm until a few months ago. Now every possible job they can handle is being given to them. Everywhere I heard the same tale from employers, managers, overseers, teachers, from every man who had had any dealings with the women workers—they are intelli-

gent, eager and quick to learn, easy to teach; they are punctual and regular in attendance; they are tractable and obedient and don't "raise trouble"; they are amazingly keen on their work, take an interest in it, stick closely to it, and honestly do their best all the time. For munition work which is within their handling capacity they are apparently ideal workers. From the point of view of a firm's or an industry's progress and advancement—this may have little to do with war work, but is, I think, interesting—most of the engineers I spoke with agreed that the women are not as good as the men, because the women have not the initiative or inventiveness, would not think of or suggest any alteration or improvement in machinery or details of their work; would, for instance, go on for ever taking ten movements of hands and arms in lifting, moving, and laying down each part if they had first been taught to do it in ten

movements, and quite ignoring any discovery they themselves might make that the same thing could be done in nine moves or less. And it appears they have little ambition, don't tire of one simple job and worry to be promoted to a less easy, higher-standard one as men do. Offsetting all this, we must remember that women are new to such work, and everyone admits it utterly surprising they should have picked it up so completely and well. For their keenness and the intelligent handling of their tools I need no hearsay evidence. I saw enough of it myself. In shop after shop I moved about amongst these women, saw them pulling levers, turning hand-wheels, sliding cutters to and from their exact positions, handling complicated-looking lathes and presses and machines as if they had been born and reared to the job, although actually 99 per cent. had never had hand on any machine more intricate than a washhouse

mangle. They are doing work, too, that a good many men would hesitate about tackling. Personally, I should be sorry, for instance, to be doing the riveting on of shell base-plates with a riveting machine which delivers its hammer-blows at a rate of about 2,000 a minute, a fiercely rapid roar of jarring blows that made one's ears and temples throb to hear for a few minutes. Yet women to whom I spoke on that work smiled cheerfully and merely remarked that "you get used to it in time." Perhaps, but I don't envy them the time till they do.

Everywhere I saw the women, fresh young girls and elderly toil-worn women alike, closely intent on their work, wasting no fraction of a second between the completion of one tool's cutting and its withdrawal and the substitution of the next tool—and such fractions are the more precious when their loss means waste of a valuable lathe's time as well as the operator's—

obviously driving the work, giving hand and mind and eye to getting through it quickly and getting on to the next. Among many impressions I retain very clearly of the women's deftness and hustling intentness there is one I remember especially. A young and pretty girl was testing shell-fuses, and as I stopped with the manager beside her she flicked one quick upward glance from her work to us and went on swiftly and steadily with her job. The manager explained to me what she was doing. A box of fuses stood at her left hand ; fixed to the bench before her was an instrument which the touch on a lever set revolving rapidly, and a little to the right and beyond this stood a sort of clock-face with a pointer moving round and indicating the speed of the machine's revolutions. The operator picked up a fuse, slipped it in the revolving-wheel centre, and started the machine. " Watch

the centre of the fuse," said the manager. I watched it spinning until it lost all shape or outline and became a mere blur. Then—*click*, a tiny black hole appeared in the centre, the operator switched off the current, slipped out the fuse, and put it aside as "passed correct"! "This time," said the manager, "try to see what figure the clock-finger indicates at the instant the black hole appears." It was harder to do than it sounds, simply because that girl was so impishly quick at seeing the two things in the same instant that the machine was slowing and the clock-finger sliding backward and slowing before I could get my eye on to it. But by watching the clock and ignoring the fuse I found the needle always went to within a shade of the same point before it checked and slowed. "The whole thing," said the manager, "is simply a speed test of a shutter which must open only after the speed of revolutions reaches a certain



number, and always before it rises to another certain number. With the shutter working correctly, the shell must be moving at a certain speed and spin before that opening comes to allow the flash to pass and burst the shell. It is a check against premature bursts, I believe."

Through all this the girl's flying fingers never halted or slowed, her eyes never strayed from their set lines. She appeared to be doing two things at once all the time, to be watching and catching un-failingly the flashing wink of the opening black eye in the blurring circle, the swing of the quivering needle-point, and at the same time to see where to find the next fuse, the starting lever, the place to put the fuse "passed." Once she slipped out a fuse, prodded and fiddled at it a moment with some mysteriously appearing tools, jabbed it back in the machine, whirled it, stopped it, slid it to the "passed"

side, and without pause went on to the next. "That," said the manager, "was a 'fault' she spotted—shutter opened too soon or too late. Slight fault evidently she could rectify herself. If she couldn't she'd have sent it back as a reject."

The manager spoke to her, and she answered him without lifting her head or her eye or checking her hand an instant. And in turn I spoke to her and told her just what the work she was doing meant to the Front. At my first word she just flicked that quick glance at me again and kept on smoothly and swiftly at her work. So, without interrupting her, I went on and told her what a "premature" through a faulty fuse might mean, at our end—a high explosive bursting in the bore, blowing out the breech-block, splitting the piece, killing and wounding perhaps every other man, or every man at the gun; or a shrapnel prematuring at the muzzle, and the bullets that should

have gone lifting high and clear inside the case smashing, perhaps, into the open rear of a gun-emplacment or a battery a few hundred yards in front of the prematuring gun ; or a shell exploding a second or two before it should, some bare scores of yards short of where it should have burst, spilling its hundreds of bullets down into our own trenches instead of the enemy's, hindering and hurting our own men instead of helping them. If she had missed that fault she had just caught, I told her, the shell that fuse was fitted to might, probably would, have done some such deadly work ; and every fuse she tested and passed good was one other certain to do its proper work and help our men to storm a trench or hold off an assault.

Then I came away, and I suppose she is sitting there now, her slender fingers flying deftly to and fro, her pretty head and soft hair bent over that whirling machine, her young girl's eyes wide and intent on the

blurring fuse and the jumping needle, at either elbow a heaped pile of golden-gleaming metal that soon or late will go roaring out from the guns in flaming cordite blasts to beat a way through for the Front to take to Victory and Peace.

In a way she is typical of the women on war work, turning their skill and deftness, giving their youth and strength to "do their bit" and help the Front. She is more significant than any picture of a blood- and mud-stained fighting man, for she is emblematical of the work that must be done, and—thanks be—at last is being done, to win the War.





# MICROCOPY RESOLUTION TEST CHART

(ANSI and ISO TEST CHART No. 2)



1.45

1.50

1.56

1.63

1.71

1.80

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2.06

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## VI

### THE MASTER JOB

IF we at the Front felt aggrieved last spring that the winter had been wasted, that there had not been nearly enough hustling done on war work at Home, certain it is that we can have no such complaint to make this spring, or even now. The one great outstanding feature of all the war works to-day is the way everything is being driven and speeded up. I have told a fraction of what I have seen of this, of the green fields of six months back covered now with busy works, of new floor after floor being piled on existing works, wing after wing added to them, scores upon



scores of new machines being built or imported and set up and to work, of hundreds and thousands of new hands being taught and employed, of huge firms adapted to war work, of new firms and National Factories working smooth and at top speed, of practically every works and every machine running night and day without halt, of the double and triple shifts of workers keeping the tireless machines whirling and grinding and hammering from dawn to dusk, and without pause from dusk on again to dawn. Perhaps amongst the many other things I have had to tell, this one great fact of hustle and increasing hustle has been a little overshadowed, and I had better give one clear instance where the fact stands out sharp and stark, where nothing is so evident, where almost nothing else is evident, but the one great and wonderful haste. The particular effort deserves the telling all the more because it is the tale of the Master Job, the

greatest war factory in the world. You will always remember that if I am unsatisfactorily vague in some of the details and altogether miss out others, it is because I may not and would not "give information of value to the enemy." Probably, despite the many precautions taken, the enemy knows all about it, but this can only be through spies, and since the bigness of a spy's pay is apt to depend on the bigness of his news—or lies—at least I need not corroborate them. The new factory then is a National one, a huge plan to do, under the State and the Munitions Ministry, a volume of work which will presently be ready for it, and which no one works or several combined works is now capable of handling. Without being too exact, I may say that the area of the works covers a piece of country about twelve miles long and at no part less than a mile across. Think a moment what that alone means—twelve miles, the length

of the Front running, say, from Loos up past Cambrin, the Brick Fields, Cuinchy and Givenchy, on by Indian Village and the Richebourg battle-front, Rue du Bois, Bois du Biez, and Port Arthur to about Neuve Chapelle. Take it another way, and it measures one of the marches you go from the firing-line back down the La Bassée Road to Bethune, through it, and on again to about Lillers. It is roughly twelve miles from Richmond across all London to Blackheath, from Alexandra Park down to Croydon. Twelve miles is more than double the width of the city of Glasgow from east to west, four times its extent from north to south. That may bring home to you what the twelve-mile length of the new munition works means. The engineer who took me round drove me in a fast car, out and across and back, in what I thought quite a big three-cornered wedge, but the ground covered, long though it appeared on the

drive, shrank to a mere corner of the whole when I saw it on the map. Sitting in the car and looking round over long vistas and streets of huts and houses, I could see in one direction to a clump of wood outlined in toy trees against the sky ; in another over a wide flat expanse with tiny dots of buildings in the far distance, to where the ground swelled and rose and fell away again in a tumble of plantations and hills and hollows ; in another down a long road and a jumble of finished huts and naked, unfinished framings to where the horizon faded off into the indefinite distance ; in yet another to where my eye searched along the skyline for the dot which was actually the big building of a power-station. Then I was told that all I could see around me was inside the boundaries of the works area as well as plenty beyond that I could not see. I saw the spread of the area as a whole on a five-foot-long map and saw the criss-cross

of roads, the rows upon rows and clumps after clumps of dots that marked the buildings of workshops and workers' houses—and even then, although there are huts for quite a number of thousands, many of the workers are being housed outside the area, a motor-bus system being run to carry them to and from their work. The buildings are of wood, steel, and brick construction, and they are already there, complete or incomplete, in tens and scores and hundreds. The town, with its stores and shops, its churches and cinema-show, clubs, canteens, and reading-rooms, is solidly built of stone, brick, steel, and wood. There are a score of undertakings in hand which here are mere side-lines, although each of them is a huge contract in itself. There is a system of railways, a main line and many branch lines and sidings, that runs to perhaps fifty miles of rails. There are vast water, drainage, and lighting systems, powerful pumping-

stations, and a great reservoir; and a tremendous power-house to carry electricity throughout the area. For mile after mile I drove along roads with a line of great 33-inch diameter pipes laid along the ditch, and past regiments of navvies digging them in. There is another seven- or eight-mile stretch of 27-inch pipes and innumerable miles of smaller piping. The workers now engaged on construction work would make many line battalions of full fighting strength; the hands to be employed will run in numbers into brigades and divisions.

Now if all these facts convey any idea to you of the colossal size of the job, you may understand what organisation, what energy, what energy has been required to plan, to execute the whole work, to build and equip it and set it running in a matter of mere months. The work that on ordinary contract, with smooth working and no day's hitch, with all the advantage of peace-time

work—unlimited labour, material and transport to be had for the asking and paying—would have occupied at the very least three to four years, is being done here inside six months. What that means only the heads, the officials and managers and engineers and contractors, will ever know. The shifts and stratagems that have had to be employed to find and keep labour, to get the materials required or their efficient substitutes, to secure transport to and on the area, to house and feed the workers, to fight the weather, the wet and the frost especially, would fill many books, would make a record of energy, efficiency, foresight, and resourcefulness which would be for ever a pride to the Empire. The country has conferred some large-sized powers on the Ministry of Munitions—larger perhaps than is generally realised—and I must say the Ministry has grabbed the powers with both hands and, through its lieutenants, is wielding them in

all sorts of unexpectedly useful ways. On the Master Job, for instance, there was need for a lot of road transport, and mechanical transport was not easy to find. But somehow and anyhow it was found, and one traction engine that I saw puffing and snorting at the head of a rumbling wagon string gives an index to the ways and means of the finding. The engine still bore the legend "Jenkin's Galloping Horses," and, it appears, previous to its commandeering had been trundling from town to town a full set of caravans, and then converting itself into one of those power-engines which are familiar sights at country fairs driving a circle of prancing wooden chargers or sea-sicky switchback boats in a swing roundabout to the brazen music of a mechanical band.

There was another difficulty to be overcome in the way of finding all sorts of materials. Here, again, the powers that be did not hesitate to commandeer where more



usual methods could not prevail. The Ministry inspectors and engineers apparently know what every firm in the country is busy about, and they simply reported where anything specially required was to be found. Thus and so, some corrugated-iron sheds and huts in course of construction on contract and destined for some places at the other ends of the earth find themselves hastily transported to Somewhere in Britain and hurriedly erected there instead of at Sumatra or Zanzibar. The buildings required some converting and altering perhaps to adapt them to use in a chilly, damp-laden country instead of under tropical skies, but such difficulties are very minor ones to the men who are running this job. There have been and still are greater ones that are constantly being surmounted. There were fewer in the summer months perhaps, but in the frost and rain of a cold and wet winter all the canons of carpentering, masonry, and building construction have

been flouted and set aside. Any builder will tell you how impossible it is, for instance, to lay concrete in frosty weather. As a rule the builder may not have descended to details of the why and the wherefore, but here the causes were sought, found, and overcome. When it was necessary the water for mixing the concrete was heated and the stones were warmed, and when the concrete was spread it was carefully covered with straw or cinders or anything that would keep the frost off it. Sometimes a roof would be run up to keep off the rain, a temporary break-wind wall erected to hold out the winds, blazing fires lit in braziers to fight off the frost, so that mortar might be mixed and brick walls built. Building work, it has always been understood, must cease when the winter sets in. Here nothing ceases, everything drives ahead at high-pressure speed.

The whole of the area is still more or less under construction, more or less completed.

In some parts rows of huts and houses stand practically ready for occupation ; in others the work is in its first stages, and the ground is one weltering chaos of heaped earth and rough holes, up-torn turf, piled planks, bricks, mortar, and building material. Swarms of men hammer and hew and dig and burrow amidst the confusion ; perky, self-important-looking little " pug " engines puff and pant and haul their trailing strings of wagons amongst the earth heaps and holes, round and between the lumber and the foundations and frames of unerected buildings.

In other parts the green turf of the fields is still undisturbed, but already it is scored deep with wheel-tracks, is plotted out for the coming of the diggers and builders. By the end of spring they will have gone, the twelve-mile stretch will be humming from end to end with munition workers, will be pouring out in a stupendous stream the fighting-food of the firing line. Until it is

complete the daily routine is one of constant hustle, of planning and contriving and dovetailing one piece of work into another, of keeping each and all hustling fast on the move. Nothing is allowed to halt or check or stay the work; everything must give way to the need for haste. Time is always money, but here it is more than money; it is an expenditure, not only of money, but without stint of brain and muscle power. Work is planned to commence by a certain date and by that date be sure it will commence, and the Front will feel the rush of the increased torrent that will come sluicing out from the Master Job.

There are other greatly planned and wonderfully executed works which only in their size are outdistanced by the Master Job. I saw one such new works, so new that in parts the fields are still scattered with cabbage stumps or trampled turnips, so new that only at the end of this last

September was the first sod cut. The end of September—and by the First of January the first section was due to be turning out munitions. When I was there the big boilers of the power-station were not ready to be installed, but a temporary boiler had been dug out from Heaven knows where, and its chimney was pouring out smoke as the temporary furnace prepared for a trial run. When I saw the place, only about fifty working days had passed from the cutting of that first sod, and yet here were rows of completed workrooms, completed in some down to the varnished walls and the linoleumed floors, the steam-heating, and the electric lamps over the work benches. There are a dozen 100-ton stores, miles upon miles of raised board walks (the “clean way” that in a works handling explosives keeps the feet of the workers out of mud or earth or grit), of steam-heating pipes, of railway and trolley rails. There are scores

of magazines, many scores of huts and houses, railway sidings to allow of the handling of many hundred tons a day.

There are to be thousands of hands employed on each shift—the works will be run on the night-and-day plan that appears to be the regular rule in munition works now—and the first of them were to start inside a month from the time I was there. If I hadn't had the evidence of the many finished buildings, and the vast amount of completed work there before my eyes, I should have doubted the possibility of that early start. There seemed such an impossible amount still to do. Running out from the railway ran a long, box-built passageway straddling above ground on criss-cross piles and scaffolding, breaking off raggedly and abruptly in mid-air. Beyond this there is to be a large room for the explosives workers to change and dress, but this room was then no more than the surveyor's markings on

the ground. The site of the engine-room was a wide and deep hole walled round with close-set, stout, water-tight planking and bottomed with unpleasant mud. Altogether it looked about as hopeless a task as one could find to get such a raw welter running in any completed part for many, many months; and yet, having seen the outcome of the previous fifty working days, having met and talked with some of the hard-headed, warm-blooded, live-wire men who are running the job, I have not the faintest doubt but that their plans have worked out, that by the time this is in print the work will have begun.<sup>1</sup>

Once more it is the managers, the engineers, the contractors, the business brains and energy of these and the local Munitions Committee that have played the part of modern wizards and magicians, that are turning an aching, empty desolation of waste

<sup>1</sup> Work commenced—January.

land into a spick-and-span bustling works. Here, again, difficulties have been met only to be overcome promptly and efficiently—and if you saw the ankle-deep, rutted mud, the water-tight, plank-sided box that had to be sunk a good ten feet to find foundations for the engine-room bed, the crane-engine overtilted and sunk in the mud where the unstable soil had yielded to the platform piles, sank lop-sidedly, and left the engine to slide gently overboard—if you saw these and many other things, you would begin to appreciate some of the difficulties. But, after all, there they are—a Master Job and many mastered jobs. And every week that passes brings more of them to completion and nearer to completion, nearer to the day we wait when no effort of the Front can outrun the efforts of the war works.



## VII

### “THEIR BIT”

I HAVE spoken already of “The Room of the Old Men,” one of the finest samples I have seen of a patriotic endeavour by the workers to be up and “doing their bit” for the country and the Front. The Room is part of a National Factory that was commenced upon only last July. The men in it are skilled mechanics and engineers, doing the work which only skilled men can do, work without which a munitions factory cannot run. They are nearly all old men, men who had retired from their trade eight or ten or twelve years back, who, after a good long

life of hard work in the shops, had taken off their overalls and laid down their tools, as they thought then, for good and ever. The manager took me round amongst them and introduced me to them and gave me a chance to speak to them and tell them that I hoped to let the Front know of their plucky retackling of their old jobs. Old as they were, up to the oldest of them—68 he proudly admitted to—they were doing a full and hard day's work. One man in that room, for all his rough, toil-hardened hands and work-stained clothes, is worth his £20,000. Another when he dropped his trade had invested in "a little farm well filled" and worth its thousands of any man's good money. And that man works each day in the factory from 8 a.m. to 5 p.m., and before he comes in from his little moorland farm, and at night after he returns to it from his day's work, he milks his cows, and feeds his

chickens, and settles up the odd jobs that must be done each day upon a farm. All the Old Men felt exactly the same way about the War. They were too old—very regretfully they were too old—to do their bit in khaki at the Front, but they were glad and thankful for the chance that was still left to them to do their bit in the shops. The manager, a local man himself, knowing the district well, when he took up the munition work went over in his mind all the old and retired mechanics he could remember. He went round to them and put the facts straight to them—the Front was held up for munitions, a National Factory was being started in their town, there was a sad lack of the skilled men that they, skilled men themselves, well knew were necessary, and—would they come? *Would they?* They were ready, then and there, to put on their caps, and walk back to the works with him, and start in on the

job. And there they are now. The general manager, by the way, was deservedly enthusiastic about his Old Men and their fine effort, but he said exactly nothing at all about his own. That I discovered, by questioning, from the Ministry official who was showing me round the district. He told me how the general manager had been running a business of his own, but had left it when the word went round for business men and practical men to help the Munitions Ministry, how the works had been got together, how machines had had to be found and tools made, how the working of an industry quite new to him had to be learned first and taught to others afterwards, how under his planning and guidance the factory had been set running, how efficiently and fast it was turning out the work, how the Ministry in London had admitted the usefulness of workings and figures furnished by him, and, finally, how all his work had

been and was being done without a penny of salary or recompense. It isn't a bad “bit” for one man to be doing.

In startling contrast to the Room of the Old Men I was introduced to the works manager—aged 22. His is an old head on young shoulders, however, and I heard much of his share in the factory's “bit.” “Takes his job serious, does our works manager,” I was told. “When we were puzzling out ways o' work he used to sit up nights thinkin' shells, an' go to 's bed dreamin' shells. Took it that serious, couldn't see a joke if 't poked him in the eye.” And the works manager just grinned and let it go at that.

It was in this same factory, by the way, that I met one of those inspectors who in all factories pass the completed shells as correct, and who, in this instance, was an ex-cheese-monger. Amongst these same inspectors you can find ex- all sorts of trades and professions,

from actors and acrobats to schoolmasters and sausage-makers. There was a question raised in Parliament recently about these men, and a good deal of would-be wit was expended on the folly of employing such amateurs to act as experts. But, after all, I see no faintest reason for the gibes. The work these men are doing is not impossible or even difficult for an intelligent man to learn. They have to pass gauges over the shell and the shell must fit all the gauges. They have to see that no flaw or crack is visible, that varnish is smooth and even, and so on. There is nothing, I should say, nearly as difficult in finding flaws in a shell as there is in making the same shell—and the shell has been made by once unskilled hands or “amateurs.” When all is said and done, the very great majority of munition-makers to-day are amateurs, although they have each become expert on their own work—as the inspectors have. The British Army

that is going to whip Germany presently is composed almost solidly of amateur soldiers, of just the same ex- this, that, and t'other trade and profession as the munition workers and inspectors. And, when you think of it, many Members of Parliament are themselves amateurs at their job, or were not long since, and were also ex-all-sorts before they were M.P.'s. I don't see why they should fling-stones at the amateur inspectors who, like everybody else on this game, are only doing their best to “do their bit.”

In a rifle cartridge factory I saw girls who were examining the brass cartridges for defects. A girl would take a handful of cartridges and roll them rapidly one after another across her palm, and, quick and constant as the motion was, she missed no slightest fault. Some defects, indeed, were so slight that when I picked up some of the rejects I could see nothing wrong even on close and slow examination

until the girl pointed out a tiny scratch, a rough dot, an almost invisible dent or bulge. There can be no hope of finding expert engineers (if that is what the M.P.'s want) as inspectors here. The cartridges are pouring from that factory at a rate of millions a week. Walking about the works, you see girls shovelling brass cases with a thing like a big coal-scoop into the capacious maws of hoppers to machines that joggle and jolt the cylinders into their back teeth, and turn and solemnly chew them over, and slide them out in a clicking and tinkling stream, with one more operation performed on their way to completion. Everywhere you may meet full barrels of cartridges wheeling round, or standing in rows, or being emptied and filled; you can see miles of ribbon-like brass bands sliding under punches that chop round discs from them, watch the discs running in hundreds from machine to machine, each



machine giving it a punch in the passing and pressing it more and more into its finished stage. You may watch long ropes of lead running off fat reels into and through the machines which chop it into lengths and shape it into bullet-cores which stream along to meet another converging stream of nickel cases and become one with it; and pour on further to join up with the brass cartridges after they have run through the filling factory and had the cordite pushed in and sliced off and a wad rammed on top. And the surging torrent of completed, capped, cordited, wadded, and bulleted cartridges that sweeps into the packing-rooms and out from the factory is so largely the work of “amateurs” that there are about ten new hands employed for each one of the old hands that used to man the works. And when that factory is completed it will be turning out 5,000,000 cartridges a week—mainly by the hands of “amateur” girls

swept in from all over the country to "do their bit."

.It is true that the professionals in machine-making have done much to smooth the path of the amateur. Some of the semi-automatic and automatic machines are so wonderful that one might imagine them endowed with life and professional skill themselves. I have watched, fascinated, the work of a screw-making machine which, after turning the tiny thread, reached over a steel finger and thumb, picked up the screw, lifted it back to a new position and jammed it there for another tool to slide forward at the precisely right second and cut out the cross-nick on the screw-head. There are automatic lathes which seize a steel or brass rod pushed within their clutch and chop it up and make shoulders and grooves and screw-threads on its outside, and drill out the centre and put another and different sized and shaped set of carvings on the inside,

throw out the finished part, pull in the metal rod, and commence work afresh on it. Some of these lathes have five or six tools running and each performing its part in turn on the fuse or shell part. In one small-arm factory there is a huge room full of these automatic lathes all whirring and grinding away at their hardest. And the men in that room are so few that one hardly notices them and has an impression that the shop is cheerfully running itself. Actually there is one man to each ten machines, to keep the long brass or steel rods passing into their busy wheels and tools, to maintain and regulate the flow of lubricant which runs constantly on each cutting tool. In this factory there are automatics drilling out the rifle-barrels, the drill pressing in so far at a time, when the machine carefully withdraws it for a busy little steel hand to poke forward and fussily brush off the grit and chips and clear the drill, which then slides smoothly

back and goes on with its job. A stream of oil runs on each drill, and something like 1,000 horse-power is required for nothing but the pumping of this oil to the rifle-drilling machines. The factory is turning out 8,000 completed rifles and over 300 machine-guns a week now. And, after the usual fashion, it is busily preparing to add heavily to its output. About twelve acres of new floor space have already been added to the works, and new floor is still being piled on floor, filled with another tossing and churning sea of machinery as fast as it is made ready, and driven up into its top working speed at once. On top of the one room packed with workers and machines the builders are at work on another room, laying the concrete floor, riveting the steel girders of new walls, putting on another new roof. And the moment the floor is down and the roof on and the steel skeleton complete, in come the men who erect the

overhead shafting and fill the windows with glass—I might say fill the walls with glass, for each shop is nothing but a glass-sided box—and start to erect the machines. Each of the new glass boxes is about 600 feet long by 40 feet wide, and there are whole blocks of them erected or with the builders hard at work turning another roof-top into the floor of still another shop. It is plain that the present output is going to do some tall climbing very soon.

I find that my available space is running short, while I have still left untold much that I have seen, so I must be content to assure the Front that I have covered the ground of munition work more fully than these writings may indicate. I don't think I left any department of the work untouched. I saw the making of bombs and grenades and air-torpedoes, trench-mortars and bomb-throwers—cheerful things some of these

too, throwing bombs and winged torpedoes of impressive size with accuracy for hundreds of yards—shells, innumerable shells, from the pill, standing man-high and measuring about four feet round the waist, that “Granny” throws, down through all the sizes of the twelve-inch, and of “Mother’s” fit, to the fodder for the ubiquitous 18-pounders and Four-point-five “hows,” and still down to the fancy sizes for the anti-aircraft and the pretty little one-pounder pom-poms. I saw all shapes and sizes of guns too—massive, lengthy monsters in stages running from the huge rough castings to the smooth shining and polished tubes, fat-bodied squat howitzers, and, laid out in rows, many field-guns, and, ranked in battery upon battery, many more light Q.F. and machine-guns. There was an aeroplane factory where at least a score of ’planes stood in various stages, from one completely built and ready for her engines, to those still only

in dismembered finished parts, to say nothing of the piles of parts in the making. Here alone the one firm I should have supposed were turning out more finished 'planes per week—battle-'planes and observing-'planes and fast-flying scout-'planes—than all our armies could find a use for; and yet there are, even to my own knowledge, several other 'plane factories.

So that you may take it I have made a full and comprehensive round, have satisfied myself in order that I might fully satisfy the Front that all their munition wants are going to be satisfied up to and over the hilt. I can only finish the report of my observations with the same assurance as I began it—we are never going to be short of munitions again. Send them as fast and hot and heavy as we can, the workshops can make faster than the Front can use; and the longer the War runs the more completely we shall be armed and equipped to wage it. All this

seems certain and positive if—it is the only “if,” although it might be a big one—*if* the war-workers continue to do their share, *if* they play up and back us in playing out the game.



## VIII

### THE GREAT "IF"

IN my previous chapters I have told the Front what I could of the rising tide of munitions, of what they may expect from the gigantic effort that is at last being made in war work. I have said, judging from what I have seen, nothing can stand against our armies and the torrent of shells and munitions they will assuredly have from and after the spring—if the war-workers play out their part. That is the one and only "if," but in the war works I have seen and heard some indication that the "if" still remains, and now I want to say a word, as one who

went through that first winter and a year at the Front, to the workers at Home, to ask the men in the trenches to write home to any and every man or woman they may know in the war works and urge them to every possible effort as I here urge them.

There is every evidence, and evidence that is under the hands and before the eyes of the war-workers, of the enormous amount of munitions now forthcoming. What I am anxious to impress upon them is the enormous amount the Front wants and needs if it is to get a fair show. I have no wish to belittle—even if it were possible—the war-workers' efforts, but I do want them to understand that they cannot afford to slacken that effort for a single day if an adequate, a really adequate supply is to be maintained at the Front. A new National Factory and its workers may be justly proud of their output of 5,000 shells a week, and think they are doing enormously well if by

the spring they are trebling that output. But let them remember this—one single insignificant battery of Field Artillery can fire away that present week's output in one day, a Brigade of Field Artillery can use that week's trebled output of 15,000 shells in the day again. The workers may fairly argue that their factory is only one, that dozens, scores of other factories are each turning out as many or more shells. But so at the Front are there many guns and many batteries. Has the average worker any idea how many Field Batteries there are in the Army to-day? I may not say, but it is common knowledge that the batteries run into very large numbers, and are going to take many shells to feed, are going to keep the war-workers sweating again to keep the guns going. In the battle-lines of the Western Front—I should say battle-line, because, even if a thrust is being made on any one part of a few miles,

it means that an attack must be made strongly along the whole line to prevent the enemy knowing where the main attempt is being made—there are a prodigious number of guns employed. At a distance behind the infantry trenches the ground is simply packed with guns and batteries. Hitherto we have hardly had the guns going full pelt for more than a day or two at a time. We have no wish to anticipate any such spasmodic and unsustained efforts again. On the Western Front, or the Balkan Front, or any other front, when the real Big Push comes we must look to see a battle fought fiercely and desperately week after week without a pause. We want to see the Germans hammered out of one position, pressed hard and close and hurled out of the next, driven hard again, battered and pushed in and battered and thrust out again and again, treated, in fact, in just the sort of fashion they used against the Russians in

the Eastern drive. We can only do that as the Germans did it—by the use of overwhelming torrents of artillery, rifle, and machine-gun fire, grenades and bombs. Be very sure that if and when we commence an offensive on those lines, the Germans are going to reply in like fashion, are going to go all out to beat down our heaviest fire with their still heavier one. The workers at home know the enormous amount of munitions preparing here, but the Front knows and feels the equally great effort of the German workshops. In old days we have known it too often by having to sit and suffer under it while our own reply was hopelessly inadequate; now our great hope is that at last we are going to be on something better than level terms. But to put us on such terms the war-workers have still to strain every nerve and muscle, put out every ounce they possibly can. The whole thing rests

on them. They have been given the material, the shops, the machines; they have got the finest brains of the Empire guiding their efforts and ensuring that the greatest possible result is obtained from their work. So it is up to them, and to them only.

I don't think there is the slightest fear that on the whole the war-workers are going to fail us, but it is impossible to avoid seeing that enormous damage and desperate delay may occur through the slacking or indifference or discontent of any one section of the workers. In this great business of munition-making it is inevitable that all the parts should dovetail, and that the output should advance in one long even wave. It is no use having a million shells if, because the fuse-makers have failed, there are not a million fuses to fit them; it is just as useless having a million shells and fuses if

the million cartridge-cases are not ready, and a million charges of cordite made, and the guns to fire them completed, and the gun-carriages built, and the telescopic or prismatic sights made, and the gunners' maps printed, and the boots and clothes and equipments provided for the gunners. And even if every last possible arm and ammunition and equipment is completed in the artillery, the battle-line must halt, or, still worse, must be beaten back and brutally punished, if there is a shortage of machine-guns or cartridges or bombs or grenades. In a great battle every branch of the Army must move and work together and keep the pace as one great and unbroken whole, and it is equally vital that the battle of the war-workers must run in exactly the same fashion. The men making one of many fuse-parts may lose us a battle if they hang up their work and prevent the fuses being finished and so leave the guns

short of shells, the Front without artillery support. The whole business of munition-making must be hung up if the coal-miners, the transport workers, the engineers, the explosive makers, almost any one section of the war-workers, fail us. Such a complete hold-up may be unthinkable, but there is another danger which is more possible and almost equally lamentable. There are still some war-workers who appear to consider the War as merely grinding out a grist of profit and good wages to them; another lot who are still more concerned over their hours and pay and conditions of labour, over labour rules and laws, written and unwritten, over the profits the employers are making or supposed to be making, over their position and status when the war is finished, than ever they are over the winning of the war. I know one works where there are two departments engaged on making six-inch



and eight-inch shells. In some way, which for the moment is of no matter, the six-inch workers are paid at a lower rate than the eight-inch workers. The wages of the six-inch workers cannot be raised because that would raise the cost of the shells above the contract price ; the wages of the eight-inch workers may not be lowered to level them with the six-inchers. The result is that the higher-paid men deliberately restrict their output, make fewer shells per week than they could do, so that they will only draw a weekly sum about equal to the less well-paid workers. And they do this out of a so-called sense of fairness, a supposed "loyalty to their mates." That is the sort of pettiness or indifference that staggers anyone who has been in the carnage and destruction and misery of the Front, who has endured the punishment resulting from a shell shortage. "Sense of fairness"—"loyalty to their mates"! What about

fairness to the Front, loyalty to their mates and sons and brothers in the trenches? How I wish I could make these men understand what it means to see a line of infantry hung up by barbed wire, hacking desperately at it, running up and down its face in frantic groups searching for a gap and a clear path for their bayonets, to see these stout hearts falling in hundreds under a hail of lead, the blast of machine-gun and rifle fire and bursting bombs, to watch the line dwindle and wither and melt away to heaps and clumps of dead lying still in the mud or squirming in the clutch of the wire entanglements, to scattered figures crawling and rolling and dragging their broken limbs and shattered bodies back across the shell- and bullet-swept ground in a last struggle to reach shelter. If only the most discontented workers could see such a sight, would realise that it was due to nothing but the wire entanglements not being com-

pletely swept away because sufficient shells could not be spared to make a clean job of it, I wonder if they would ever again talk of "loyalty to their mates," would ever again waste a day off or an hour off, would ever again be satisfied to do anything less than their highest, biggest, and best possible output of work. There was talk the other day of the engineers wanting an all-round 15 per cent. rise in wages. No doubt they think themselves fairly entitled to this because the cost of living has risen. But that sort of thinking simply paralyses again the men at the Front. Suppose cost of living has risen, suppose it has risen 50 instead of 15 per cent. Does that mean that the engineers are going hungry or thirsty, doing without a bed to rest on or a roof to keep them dry? Their mates at the Front often do all this, and surely the war-workers might carry some slight share of the hardships without grumbling, and not, because

butter is too dear and they must eat margarine, want an immediate rise to allow them to eat butter again.

It is instances of this sort that make one realise the ugly "if." The real gravity of the position, the issue hanging upon them, cannot possibly be fairly understood by any war-workers who slack, or restrict output, or seriously concern themselves over such points as are constantly being raised about pay, hours, and status.

It seems so impossible that the critical nature of the war should not by now be understood, but I am sure that some of the war-workers do not even yet fully understand, and they may easily be misled into thinking munitions so plentiful and future supplies so promising that all danger of a shortage is over. Let them remember that our Army that was short of munitions was a very small affair compared with the Army of to-day. That production which

left, say, 200,000 men woefully short a year ago may be multiplied exactly twenty times and still leave an Army of four millions just as exactly and woefully short as ever. And it is going to take many multiplications by twenty to raise us from the hopeless shortage that kept us standing still last year, spending flesh and blood in a desperate endeavour to make up for the lacking steel and iron, and holding our bare own, to raise us from that to being an irresistible force capable of advancing and breaking through miles of trenched and barbed-wired and fortified positions, through hordes of well-armed, unbeaten men, through a flaming barrier of shells and bombs, through liquid fire and gas and machine-gun and rifle bullets. The war-workers have to keep going more than the one front of a year ago. There is now the Western Front, the Balkans, East Africa, Mesopotamia, to say

nothing of Egypt or any other battle-fronts that may develop. Our war-workers are doing wonders, are turning out mountains of munitions—but so, you may be very sure, are the enemy war-workers. They had a very long start of us, had munition factories and machines built and running, and they have been increasing these while we have been improvising and starting ours. We cannot doubt but that the German and Austrian shops are also running night and day, that the need for an enormously increased output has long since been seen and provided for, that their workers are going all out to give their armies a preponderating supply so that they may meet and beat the best our fighting and our working men can do.

The Front has no shadow of doubt about being able to beat the Germans, if our workers can beat the enemy workers. "Give us the stuff we need," says the

Front, "and we'll give you victory." The German armies are probably saying the same to their workshops, and the matter boils down to a battle of the workshops—ours and theirs. The British Army doesn't want anything more than a fair show, and only the British workers can give it them. The Army is quite and cheerfully ready and willing to hunger and thirst, to perish from cold and bitter soaking wet, to wallow in the mud and misery of the trenches, to endure bodily discomfort and aching fatigue, long marches and longer outpost watchings, and lack of sleep and rest, to suffer frost-bite and disease, loss of limbs and sight, dreadful wounds and death, so that we may win the War. They can and will win, if the war-workers will back them up, will throw in the last ounce of energy and determination they possess, will fling aside the last atom of slackness or self-indulgence or bickering or selfishness.

The fighting men are considering nothing—no question of short pay or long hours, or “what will happen when the war’s over,” or what individuals may profit by their sacrifice, or their own sacrifices and suffering—nothing but the winning of the War. And the War is as good as won, though the full price is yet to pay, if, and only if, the war-workers will think and act the same as the fighting men. Will they? The answer is with them, and with them only.



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