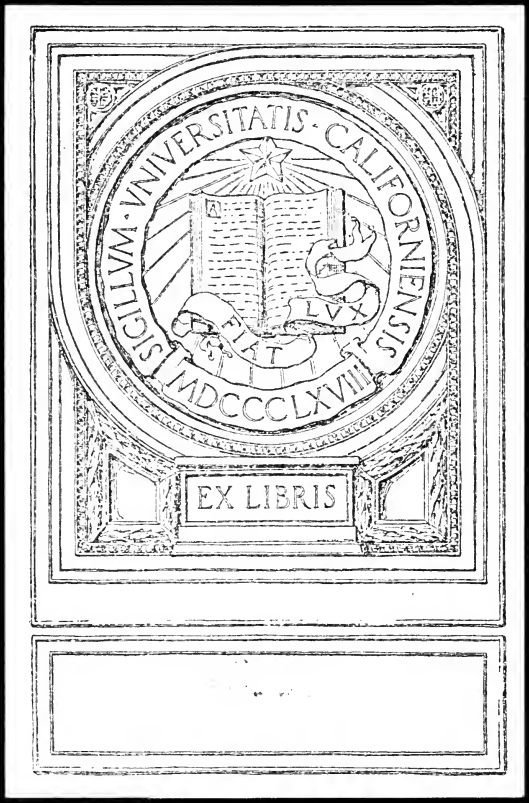
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HOW EUROPE

ARMED FOR WAR

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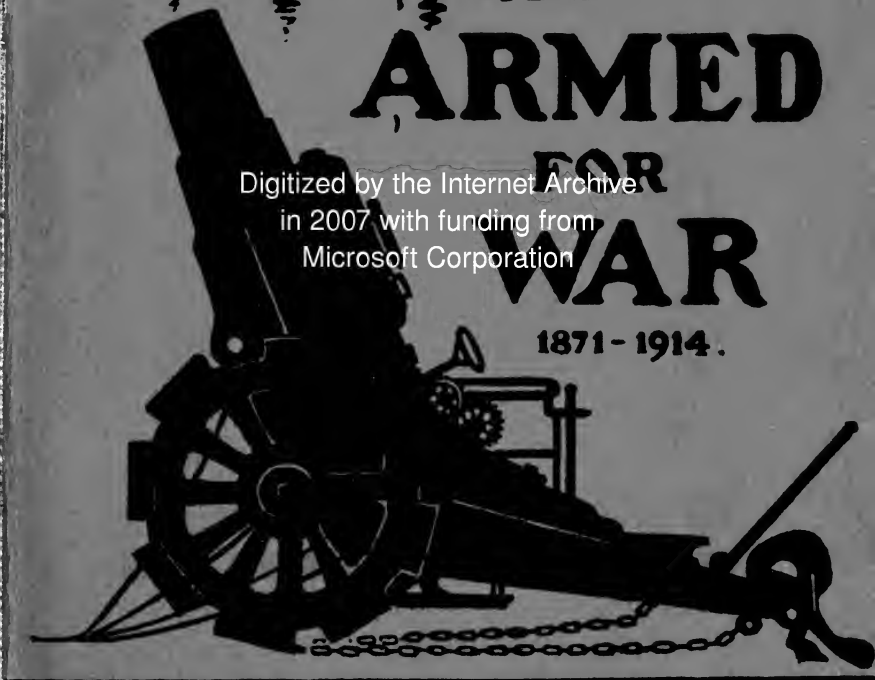

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HOW EUROPE ARMED FOR WAR

(1871 - 1914)

BY

J. T. WALTON NEWBOLD, M.A.

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TO MY FRIEND AND COMRADE,
DR. KARL LIEBKNECHT,
AT WHOSE INSTANCE
AND IN CONJUNCTION WITH WHOM
A MORE AMBITIOUS WORK
WAS PLANNED
FEBRUARY 1914.

PREFACE

THIS LITTLE WORK makes no claim to be an exhaustive analysis of the armament problem with which it deals. Nor is it written from the viewpoint of an anti-militarist agitator so much as from that of a keenly interested student of the economics of naval and military power. It endeavours to discover and to delineate the part which the engineer and the chemist have played in the perfection of war material, and the reactions which the manufacture of munitions, to meet an ever-growing demand, has had upon the metal, machinery and associated trades in industrial communities. Amid all the vast literature of naval, military, imperialist and pacifist writers one looks in vain for any thorough treatment of the war industries in relation to the development of the war system. There are a few pamphlets, but none of these are satisfactory. Very few militarists seem to have any appreciation of the dependence of the fighting services on the industrial system, whilst their opponents display an equally displeasing aversion to a closer acquaintanceship with what they regard as the unclean thing. Personally, I ungrudgingly avow a keen interest in all the wondrous machinery of war, behind, and inseparable from which, are the workshops and shipyards, ever the finest embodiments of modern production. There is romance in the war machines—the greatest triumph of human ingenuity and the crowning tragedy of its murderous application.

It is within the last half century that nations have laid up vast armaments for war in time of peace. Formerly they collected and trained men, accumulated money, but did not furnish themselves with gigantic supplies of munitions. Perhaps that is why this aspect of militarism has no literature. Never before was the soldier or the sailor a mechanic. Only to-day is he becoming a machine-minder, an operative. It is a memorable revolution, for it alters the whole nature of war.

Let us understand this new development. Before we put forward proposals for abolishing or limiting or controlling armament manufacture, let us examine the system. That is what this little book tries to do and nothing more . . . at present.

A considerable part of this book has appeared in the *Forward,* whose editor has kindly given me full consent to include the articles in my text.

The material in the following pages has been gleaned in every case, except in the last chapter, from sources sympathetic to the existing order, and all of it material published before the war. I have consulted scores of trade and professional papers, naval authorities—propagandist and otherwise—over the whole period; military journals, handbooks and standard works; financial directories—British, French, German, Austrian and Italian; the prospectuses and company reports of the most important armament firms at home, and some of those abroad.

I have also had invaluable advice, criticism and suggestions from a number of friends in financial, engineering and journalist circles. To them, as well as to Mr. Maisky, Dr. Lancelot Eden, and, not least, to my wife, for indispensable assistance in research and translations, I wish to take this opportunity of recording my thanks.

J. T. W. N.

February, 1916.

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HOW EUROPE ARMED FOR WAR

The Dawn of the Steel Age

THE WRITER does not ascribe to any one of the belligerent nations or Governments exclusive or even preponderating responsibility for the outbreak of the Great War, but rather attributes the catastrophe to the intense rivalry which has been steadily becoming more pronounced between the highly-organised European States, each seeking to attain world dominion as a means to the most effective exploitation of natural resources.

He sees in the State as it generally exists to-day no more than the collective will and action of the wealth-controlling classes to further their ambitions and to safeguard their interests. It seems to him that the purpose of the modern State was summed up in a sentence when Mr. Asquith informed the leaders of the Railwaymen in 1911 :—

> His Majesty's Government will place the whole civil and military forces of the Crown at the disposal of the railway companies. . . .

The whole civil and military forces of the State, of every State, are at the disposal of landlord and capitalist interests. The whole Governmental system is organized, primarily, in the interest of property. The State is the Propertied Interests. It has come into being, has continued and been strengthened as they have realised that they are more powerful, more capable and more comfortable when acting in association than when each provides for himself what are the necessities of all.

The State exists to-day to relieve our rulers of those responsibilities which they would, otherwise, have to undertake for themselves, and to supplement their energies with the combined effort and wisdom of the nation.

prosperity. But the age that began with Trafalgar was drawing to a close.

This country has, thanks to her vast resources of minerals, her settled form of government, and immunity from the ravages of war and civil disorder, attained and kept a position of pre-eminence in manufacture and commerce. Her peculiar advantages of situation near to but detached from the Continent, at the gates of Europe, and on the threshold of the Atlantic, together with the wisdom of her statesmen in refusing to entertain a policy of territorial expansion on the Continent, have all enabled her people to continue without interruption the accumulation of wealth and to make their country the great workshop of the world.

In all that pertains to the mechanical arts the British long maintained a leading place. They were the chief coal raisers of the world and developed an enormously productive iron and steel trade. They took the initiative in the adoption and construction of railways and supplied much of the capital required for the laying down of tracks all over the American Continent, in Asia, Africa, and elsewhere. As a maritime nation, they, naturally, tended to monopolise the sea transport services and the construction of merchant shipping for all purposes and for all owners. Far and wide over the earth British goods were borne in British cargo boats and by British freight trains, carrying British influence and earning British profits far beyond the range even of the guns of the omnipresent British Navy.

Thus came it about that when the peoples of Europe returned from the wars and began to develop their manufactures and to seek to sell their wares on the markets of neutral countries as well as at home, they encountered a long established and powerfully entrenched trading connection everywhere they went. They hastened to reinforce themselves with protective duties at home and to call upon the State to assist them in winning their way into the foreign trade. In whole industries the British were virtual monopolists, not because of superior organisation, but because they had hitherto had no competitors. Moreover, British products were cheap, well made, and had a reputation not easily acquired by new comers.

But for the exhaustion entailed by the disastrous Civil War in the "sixties" the United States would have become a keen competitor with this country at a much earlier period than she had done, and would not have fallen into the economic dependence which she so long endured, and from which she is only now emancipating herself.

The close of the Unification period released the Germans for other purposes than the mere pursuit of war, and the new Empire, filled with enthusiasm and aroused to passionate energy as a result of its three victorious wars, could devote unlimited attention and

effort to the development and organisation of its industries on the sure basis of its magnificent geographical situation, splendid natural transport facilities, and enormous natural wealth.

Meanwhile, the increasing importance of machinery in industry, its continuous tendency to specialisation and complexity, the necessity of combining strength and tensile qualities in the metal used, and the great extension of heavy transport requiring driving mechanism, steel tyres, strong axles, and durable rails, all gave a great impetus to the metal trades. The exigencies of commerce necessitated the greater use of steel and increasing experiment in its production. On the other hand, the growth in the size of field armies made necessary a rapid increase in the quantity and strength of ordnance armament, of ammunition, and man-killing devices.

The levy *en masse,* the improved musket, and the better powder demanded the invention and improvement of quick-firing artillery with which to stay the onrush of these vast bodies of well armed men. Machinery was becoming as urgent in war as in peace. Bronze guns were no longer sufficiently strong to resist the explosion of improved powders, and iron was almost useless. Ordnance manufacture required the supply of exceedingly tough steel. No less important was the metallurgy of shell manufacture.

War at sea, as evidenced in the experience before the batteries of Kinburn, in the Crimea, and the encounters of ironclads in the American War, had rendered obsolete "old wooden walls," installed the tyranny of the armour plate, and instituted the ding-dong rivalry of iron shot and iron plate, steel shot and steel plate, with all its far-reaching results on the chemistry of steel and of rending explosive.

It was war which gave us the intensive study and incessant experiments in steel and metals which have resulted in the wondrous power and use of machinery and constructional materials. War is so important that no expenditure is or can be too great to perfect the weapon that will afford momentary security. Industry owes much to the bye-products of armament manufacture just as, in the case of motor transport, war owes much to industry. Steel war-ships were followed by the widest adoption of steel for merchant ships, and this development soon resulted in closer association between steel makers and steel users. The steel makers, in their turn, searched the geological formations of Sweden and Sardinia, of Algiers and Bosnia, of Bilbao and Morocco for the richest iron ores; they came to Kirkintilloch for the raw nickel to strengthen German and French gun steel; they went to Spain for manganese and to Chili and Peru for copper.

It was in the "seventies" that men began to rear the world of peace and of war on a platform of steel bedded in the solid and liquid mineral wealth of every Continent.

The whole fabric of civilisation has now come to rest on steel

and that on coal, iron, and the other minerals. Remove the mineral basis and our complex society tumbles to the ground. They who control minerals to-day control life.

These two great revolutionary changes, one political and the other economic, which happened to coincide with the Parliamentary triumph of Gladstonian Liberalism, were destined completely to disturb the course of British political development at the same time that they did not become sufficiently evident to impress their meaning on the minds of advanced thinkers and popular leaders. Hence comes it that a whole political party continues, so far as its rank and file are concerned, to be dominated by the ideals of that earlier time and to be inspired by the international codes of honesty and justice breathed in the speeches of Bright, Cobden, and Gladstone. In a condition of puzzledom they still endeavour to reconcile the Liberalism of Asquith with that of their earlier leaders, not realising that the whole structure of British society and of the world has undergone a profound change and that new circumstances have proved too difficult for their politico-economic gospel.

Since Marx wrote *Das Capital,* even while the pioneers of Modern Socialism were spreading the new economic faith and founding the present Socialist sections, the world of the Industrial Revolution was giving place to another in which this country was to be no longer the one workshop of the world and in which Capitalism was to become super-national in its operations. The great industrial magnates were entering the spheres of government and finance and were thrusting forward their private schemes with all the forces of the State at their disposal.

In the underworld of industry new demands upon production had prompted men to new inventions and fresh discovery. Capitalism was resorting to new methods, harnessing new energies, calling science and education to its aid, systematising itself, discovering itself, and attaining consciousness of its power and its purpose.

In conquering the State it was destined to realise that the national defences could be made as lucrative to itself as they had ever been to landlordism. Everywhere, and for everything, it was necessary to have machinery and motive power. Hence, the control and development of mineral, chemical, and metallurgical resources became the most important of all the branches of Capitalist activity. Here, the needs of peace and war were to meet in the middle "eighties."

Armstrong, Krupp & Schneider

BEFORE WE begin to trace the course of armament policy in Europe subsequent to the Franco-German War, it would, probably, be as well if we said something first about the three chief armament firms of Britain, Germany and France; the three great industrial undertakings upon which these Powers, as well as Italy, Austria and Russia, not to speak of Japan, Turkey and the South American Republics, have so much depended.

For all that Krupp has been acclaimed as King of Cannons, High Priest of Destructive Armaments, and his works at Essen imaged, much as the ancients thought of Vesuvius, as the Gates of the Underworld, the mighty armourer stands by no means as the oldest maker of guns still doing business.

In reading through the Report of the Panmure Commission on the " Manufacture of Iron and Brass Ordnance in Various Continental States," issued by the War Department in 1856, there is to be found, in the sections devoted to their journey and enquiries in Prussia and other German States, not a single reference to Krupp of Essen. Krupp had, indeed, made his first gun in 1847, and presented it to the King of Prussia. He had exhibited one or two field pieces, and was conducting experiments with much energy, paying for them out of the profits he had obtained on the sale in London of his patent for iron spoons and from his large trade in locomotive tyres. He was beginning to attract a little attention from the King of Wurtemburg and the Emperor Francis Joseph, but his little steel works on the Ruhr were not considered worthy of mention in this report.

In 1857 Armstrong had become installed at the Royal Arsenal, his first gun had been accepted the year before, and now a new Royal Gun Factory was being erected at Woolwich and an ordnance works at Elswick established (in which he was not then interested but which was managed by his partners in the hydraulic and steel works adjoining) for the extensive manufacture of guns on his model and under his supervision for the re-armament of the land artillery of this country. In active operation from 1859 to 1862 a great number of guns was turned out of both works, when the agreement was terminated by the War Department owing to

military dissatisfaction with the breech-loading gun, and the Elswick Ordnance Company, presided over by Sir W. G. Armstrong, and also managed by Captain (later Sir) Andrew Noble and Mr. (later Lord) Rendel, began to make guns and later to build gunboats and other ships, noteworthy either for extraordinarily heavy guns or many smaller ones, for foreign countries and also for this country. Armstrong and the Rendels invented the gunboat, a whole flotilla of which of exceptional clumsiness, armed with one enormous muzzle-loader, they built for China just before their new breech-loader and their new light quick-firing guns rendered them obsolete.

No sooner had Armstrong had his new heavy breech-loading gun accepted by the Admiralty than he began speech-making in public on " the overwhelming demand for breech-loading guns." He sold several 110-ton monstrosities to Italy, and the hue and cry which followed in the Press resulted in the Admiralty ordering some yet more powerful 17-inch guns for our own Fleet. Ultimately, so many of these monster guns burst or cracked that both the Italians and ourselves abandoned them. Then the Government requested Vickers to make guns for them—an invitation Vickers had been arduously soliciting for four years previously—and the price of guns dropped considerably.

To judge from the sympathy Sir E. J. Reed, an ex-chief constructor at the Admiralty, bestowed on his former Department at having " fallen into the hands of Sir William Armstrong's firm," it was not a very happy arrangement—for the Admiralty.

Armstrong was a genius. His firm built a very powerful cruiser, "The Esmeralda," for Chili, and when she was completed he stated in public with much indignation that there was no warship in our Fleet could overtake her, escape from her, or fight her successfully. He pointed to the peril of our commerce from such ships.

The Admiralty soon took the gentle hint and bought most of the guns and mountings of the new improved " Esmeraldas " from Sir William Armstrong's firm. Then he went one better and built a finer cruiser, the " Piemonte," for Italy. Once more the advertisements were flung before the world, and South American States tumbled over themselves, each other, and Japan, to have improved " Piemontes " from Elswick.

Britain also had some " Piemontes," built elsewhere, indeed, but armed with guns of his newest types !

There was a time when Argentina and Chili, hurriedly arming against each other, had cruisers building alongside one another in the Elswick yard.

Lord Sydenham, who has just been elected to the Armstrong-Whitworth Board, once described Armstrong's finest battleship, designed on Armstrong's principle, as " the worst designed

armour-clad ever built." Lord Sydenham is an unrivalled naval expert. There is an even more curious development than that.

For the best part of thirty years Sir William Armstrong and Sir Joseph Whitworth, both manufacturers of guns, led an absolute cat and dog life, depreciating each other's guns. There was, however, one thing on which they were agreed, viz., that armour was a waste of good money much better expended on guns. They both made guns; neither of them made armour. Ten years after their doughty onslaught on armour, their two companies were amalgamated, and the first step taken by their successors was to lay down a magnificent plant for making armour plate!

Old Alfred Krupp was a shrewd industrial magnate of colossal energy and business capacity, otherwise he would never have won through his thirty-year struggle to keep his firm from ruin. He saw his opportunity, undoubtedly, in the efforts that Prussia was making to develop a powerful army and armament, and seems to have set himself as determinedly to prevent Spandau becoming a great State arsenal, as was intended in 1856, when all the gun and explosive departments were being grouped there in new works, as even the Sheffield colleagues of his firm's later days endeavoured to ruin Woolwich. The fact that there was no great national cannon foundry in all Germany, owing largely to the small State system there prevailing before 1866, and to the absence of any powerful competitors amongst the numerous gun makers of Augsburg, Nuremburg, Berlin, Sühl, and elsewhere, as well as German dependence on the outside supply of Sweden and Belgium, gave him his opportunity to make himself indispensable to Prussia. His guns were highly successful in the Danish War against the Danish frigates, and in the campaign of Königratz against Austria. With the financial aid of Wilhelm I., Krupp furnished the requisite armaments for the war against France. The successes of this war resulted in an enormous demand for his guns from all over the world. His own Government placed excessive reliance on him, and set out at once on a vast re-armament. Krupp still and for more than twenty years to come abstained from naval construction, but manufactured naval guns. His chief and only real rival was Hermann Gruson, of Magdeburg-Bulckau, whose speciality was machine and quick-firing guns and gun turrets. Gradually Krupp increased his holdings in coal and iron mines, and allied himself with various explosive makers. For many years he maintained an almost complete monopoly of the neutral market for land artillery, even as Armstrong and Whitworth did for naval ordnance.

The development of French armament industry was radically different from that which took place here and in Germany. France had been organised into a highly centralised State system by the Ministers of the great Bourbons, by Mazarin and Richelieu, by Colbert and Sully. This great bureaucratic system had prepared

for war on an extensive scale, and, not being able to rely on a native iron and steel industry in an age when iron was not produced extensively or profitably, and yet requiring huge armaments for that time—with which to fight the Dutch, to harass Spain and Italy, to engage Austria and Britain, and to push the French frontiers to the Rhine, had erected great gun foundries at Douai, Toulouse, and Bourges for land artillery. These were later supplemented by others for sea pieces elsewhere.

Until 1870-71, except for the period of the Revolution and the First Empire, the State relied entirely on its own works. In the war with Germany, however, the State factories entirely failed, and M. Thiers had to have recourse to the private engineering works and steel makers. The use of steel for artillery brought Schneiders their chance, and from that time onwards, viz., from 1876, they have become the Armstrong-Whitworths of France.

Their original works at Le Creusot in the Haute Loire made cannon for the Navy all through the Revolutionary and Napoleonic wars. About 1835, the Schneider family bought over the bankrupt works, and there made railway material and marine forgings, boilers, etc. They made armour plate in the early Sixties for the first French armour-clads, and in the German War supplied more than twenty batteries of field guns and sixteen batteries of machine guns in five months. In ten years—from 1876 to 1887—this firm made or supplied steel for nearly 6,000 guns for France and regularly employed 15,000 men. Working in close connection with them was the Hotchkiss Company, makers of machine and quick-firing guns. This company had grown out of the industry transferred to Paris by Mr. Hotchkiss at the end of the American Civil War, when his own countrymen no longer were at grips with each other.

The Schneider Company has also had a wonderful reputation for the excellence of its guns—as instance the " 75 " of the present war.

Other large French gun-making firms were the St. Chamond Company, the Chatillon-Commentry Company of Montlucon; the Shipbuilders of the Mediterranean with gun works erected in 1880 at Havre and older works at Marseilles, and the Cail and Co., of Paris. All these found abundance of work in the re-armament of France after the conclusion of the Franco-German War.

The Re-Armament of France and Germany

THE DISASTERS of 1870-71 had brought the whole fabric of French military organisation toppling to destruction, but when once the invader was off the soil and the new order began to shape itself, an immediate and pressing scheme of re-armament was put in hand. It was necessary to reconstruct the French military machine, to furnish new artillery of every kind and to provide immense numbers of rifles and machine-guns, as well as their ammunition.

Finally, it was resolved to draw a line of what should be impregnable fortresses across the shortened length of the new frontier from Luxemburg to Switzerland.

By the winter of 1875 the French Army was in possession of a complete re-armament of field artillery, comprising 494 batteries of six guns each and these were obtained from Creusot as well as from the State factories. The Fives-Lille Co. and the St. Chamond Steel Works were also kept busily employed. In the years 1875-1877 the last-named enterprise turned out from 800 to 1,000 guns a year. The owners of this works, Messrs. Petin and Gaudet, also supplied great quantities of rifles.

The Terre-Noire Works, Derosne and Cail, of Paris and Lille; the Forges de Firminy, the Commentry-Fouchambault Co., Marrel Bros., the Foundries of Marquise, the St. Etienne Works, and others, were busily employed turning out gun-limbers, trunnions, axles, cradles, gun-tubes, hoops, shells, caissons, rifles and other munitions.

The Chantiers de la Méditerrannée, who purchased works at Havre in 1872, made forty batteries of bronze and ten batteries of steel guns between 1870 and 1878, as well as 325 howitzers and over six hundred mountings.

The French had been fairly successful in improving the rate of their field gunfire, but were still somewhat behind the Germans, though, from many accounts, their weapons were less liable to erosion and bursts.

On the other side of the frontier the Germans had been busy

replacing much of their worn material and, in 1874, undertook the re-armament of their field artillery with a new gun of 78.5mm. with 1½ kilometres range, and with this weapon they increased their rate of fire by about one shot every thirty seconds.

Most of the work was executed by Krupp at Essen, and the remainder at the State works at Spandau, as well as at Bochum. The new guns were ready by April 1, 1875. Meanwhile, the Germans were giving great attention to their small-arm material, which has always been a matter of great care to our enemy. Hitherto, the German infantry had been armed with the famous needle-gun, invented by Dreyse in 1839, and manufactured at his works at Sommerda.

In 1871 the brothers Mauser, two mechanics employed at the State Armoury at Oberndorf, in Wurtemberg, perfected a new rifle, and they were allowed to establish a private factory with the assistance of a Berlin bank in order to turn out rifles of this pattern. The German Government also preserved to itself the right to use their patent, which was generally adopted abroad. By the close of 1875 the whole army was supplied with Mausers, some made in Liége, and others at works in Birmingham, so great was the urgency of the State's requirements.

Besides Dreyse and the Mausers, Werder, director of the Maschinenfabrik, Nuremburg, invented a rifle in 1871, and to these three establishments we must add the Broadwell factory at Karlsruhe, and Berger and Co.'s Arms Factory at Witten-on-Ruhr, which had the same importance for rifles as the neighbouring works at Essen had for artillery. Berger, in addition to rifles, made Palmkrantz machine-guns, which were greatly in request by the Russian Government.

Even more important than all these, and quite on a level with Krupp as an indispensable asset of German militarism, was a firm of whose insidious and far-reaching activities we have heard all too little, viz., Ludwig Löwe and Co.

Ludwig Löwe, one of the greatest Jewish magnates of the capitalist period, had studied the machine tool trade of the United States in 1870. He returned to his little machine tool factory, which he had established in Berlin in 1864, and, in 1871, founded the Ludwig Löwe Sewing Machine Manufacturing Co., appropriating, without acknowledgment, the designs of Pratt and Whitney, of Providence, Rhode Island (makers of the Martini-Henry rifle). He was the first to introduce American machine tools into Germany and improved upon them. In this same year, 1871, the Prussian War Department took a step of stupendous importance for the future organisation of the German arms supply. It may be that the Army Chiefs had witnessed the supply of American munitions to France in the recent war as to Britain in the Crimea. Probably they were impressed by the wonderful development of rifles and

machine-guns produced by the machine tool makers of America during and since the Civil War, but with characteristic Prussian foresight and thoroughness, the War Department decided to build up the State armament works with the aid of Ludwig Löwe. He supplied one million rear-sights, and then went on to manufacture revolvers, as well as to provide State and private factories with the requisite machine tools.

He was a member both of the Reichstag and the Prussian Landtag and one of the leaders of the Progressive party, seceding from it in 1877 on the question of its opposition to the military policy of Bismarck. He and his group subsequently joined the National Liberals and gave their support to further military expenditure.

In 1872 the Duttenhofers founded the Köln Röttweiller Powder Factory at Hamburg, and contemporaneously with them, Alfred Nobel at Krummel-on-Elbe, and J. N. Heidemann, of the Rhenish-Westphalian Powder Works, at Cologne, were enormously developing the military explosives trade to meet and encourage the Prussian demands. In 1875 the Duttenhofers and Heidemann invented a new powder better suited to the breech-loading gun, and in 1879 Germany undertook a further reorganisation of her field artillery.

Henceforward we shall find these reorganisations of artillery like those of small arms and fleets become periodic, and behind them we shall see flitting the shapes of Krupp, Schneider, Vickers, Nobel, Skoda, Löwe, Mannlicher, and others of similar nature.

Britain's Troubles Begin

THIS CONSTANTLY accelerated competition on either side the frontier, and the immense effort of the Republic between 1873 and 1878, visited upon the French steel companies, engineering and allied industries, contributing to the arts of war, remarkable prosperity. They did not hesitate to make the most of their opportunities, and invested more money in their plants and extended their artillery and other departments under the stimulus of the new demand. The steel trades received a fillip such as they needed and they were induced to undertake, partly from patriotic motives, and largely from those of a more speculative character, the improvement of the qualities of their steel.

When the French had completed the gigantic armament scheme, which promised for a time to render their fair land secure from a renewed Prussian assault, they discovered that their naval armament was in a very unsatisfactory state. So busy had they been for ten years previously in combatting the preparations and activities of Prussia that they had been compelled to neglect their Fleet.

Across the Channel, in the meanwhile, there had also been a marked slackening off of naval preparation, but, notwithstanding, Britain had gathered together a modern fleet of iron ships, most of them heavily armour-clad and more than a match for the smaller fleet of sheathed and armour-covered wooden vessels which the French had built a decade before. This condition of affairs, of course—and quite reasonably—could no longer be tolerated by France, who began, to the considerable agitation of our naval enthusiasts, to build a number of new ships, armour-clad battleships of a heavier and better armament than our own.

The most absurd and unwarrantable assertions were made by our naval extremists during the early "Eighties," and the consideration of France's unpreparedness and the amount of leeway she had to make up were never brought into account at all. Nor did our alarmists pause to recollect that whilst our dockyards could construct a battleship in about three and a half years, the French took as long as ten to get their vessels into service.

With the characteristic ingenuity of their class they always

insisted on comparing the number of our ships actually in commission with the number the French had afloat—a very different thing. They made a great deal of capital out of the bad financial system whereby the French pushed ahead the construction of their ships beyond the provision of supplies allotted by the Chamber, but did not remark that the French rate of building was much more uncertain than our own.

But we will return in another article to discuss the early armour-clad scares of the middle and late "eighties," and confine ourselves at present to noticing what was the effect on the French armament industry of this naval revival.

Whilst the upkeep of the military establishment occupied considerable energy, it was rather to the naval demand that the armament industry of France looked for support from 1878 to 1883. In this connection the same thing happened as in the former case—the shipbuilders, armour-plate makers, marine engineers, etc., called for more capital and proceeded to extend their establishments in anticipation of a steadily increasing demand. For about five years there was a run of prosperity in the war shipbuilding trade of France and the builders were beginning to see a fair prospect of wresting from their well-entrenched British competitors, from the Scotts, the Elders, the Napiers, the Thomsons, the Palmers, the Lairds, and others—some measure of the world's demand for mercantile ship construction. The French were dreaming dreams of Colonial expansion, merchant trading, sea power, and manufacturing prosperity.

Whilst it was forbidden to them to export war material, armour-plate, having been until 1876 no more than exceptionally thick ship-plate and still only a specially strong compound of steel and iron plates, was permitted to go abroad. Thus came it about that the French makers were able to secure the contracts for the supply of armour for the new Navy Law programme of the Italian Government determined on in 1877-78.

The French steel-makers, in their efforts to produce a fine gun steel, also invented a strong steel armour-plate, which met with the high approval of the Italians at the tests of armour at Spezia in 1878 and 1879. As a result, the orders for many thousands of tons of armour were placed with Schneider instead of with Charles Cammell and Co. and John Brown and Co., the other competitors.

Then, unfortunately for the French firms, their Government itself showed a predilection for Cammell's armour, and placed some of its work in Sheffield. This dashed the French firms' hopes when on top of other misfortunes came the momentous decision of the French Admiralty to abandon the construction of the battleships they had on the stocks, and to concentrate on the ships of the new vogue—torpedo boats. This was a cruel blow at the armour-plate maker and the big gun manufacturer. A serious depression faced

the French steel and shipbuilding industries thus deprived of naval orders, and with little new military demands to satisfy. Something had to be done to relieve this intolerable situation, and to compensate the firms for the outlay they had made for a demand which a change of policy had abrogated.

The writer is firmly convinced that in this temporary suspension of naval orders and considerable depression in military demand, we have good reason to see a powerful influence making for the legalisation in 1885 of the export of war material by French manufacturers.

Meanwhile, events had been occurring in the sphere of European diplomacy which made greater recourse to armaments well nigh inevitable.

The French, who had quickly recovered their national energy, after the debacle of 1870-71, turned from the dreams of European dominion which had engrossed their minds for so many long years to consider the possibilities of African expansion. Their financiers had already acquired a very considerable hold over the Egyptian Debt, and they had been deeply interested in the Suez Canal scheme. They had secured to themselves Algeria at an earlier period, and were visualising once more that Mediterranean Empire which at different seasons had tempted Louis XIV. and Napoleon I. to turn from the Vosges toward the Nile. This aspiration of the French was encouraged by Bismarck, who saw in it the occasion of endless entanglements with Britain which would distract the French from their haunting ideal of the Revenge.

The French investor desired an outlet for his rapidly accumulating capital, and the pride of the people sought some diplomatic triumph which should re-establish the reputation of their nation.

But one Power's misfortune is another's opportunity, and our Government was quick to avail itself of the weakness of the rival to fasten upon Egypt, to secure the new gate of the Mediterranean, and to safeguard the short cut to India *via* the Suez Canal. The interests of the Indian Empire, no less than those of the Egyptian bondholder, made it desirable that Egypt should pass under British control. Furthermore, the recovery of Russia and the weakening of Turkey made this an essential next step in Imperialist policy.

But the occupation of Egypt was the death-blow to French plans of African dominion, and relegated France to the ranks of the nations in decline. Ousted from Egypt, she made her entry into Tunis with the support of Bismarck and the connivance of Britain. As a result, Italy, whose dream of Tunisian dominion was thus rudely shattered, joined Germany and Austria in the Triple Alliance to obtain military assistance, and inclined more than ever to Britain for naval protection.

France also set her eyes on Morocco, and so engendered the suspicions of Spain, whose traditional interests there were considerable.

All these events and tendencies which showed themselves between 1878 and 1883 inflamed the jealousies of the Western and Southern Powers, and set France, on the one hand, and Italy, Spain, and Britain, on the other, vieing in naval outlay.

In the East, Russia was once more becoming active, and from 1871 to 1877 was busily reconstructing the Black Sea Fleet and fortifying her harbours in direct contravention of that ridiculous scrap of paper, the Treaty of Paris, in which she had promised not to do so. Taking the opportunity of the Franco-German War, she had freed herself from this undertaking given to Britain and France in 1856, and had begun another movement towards Constantinople. Turkey replied with a larger programme of ships built in this country, but, despite her naval supremacy, she was beaten in the war of 1877-78.

At the Congress of Berlin, in 1878, Britain assisted Austria in depriving Serbia of Bosnia-Herzegovina, and threw all her weight into the scale against Russia, so making barren the victories of the Tsar.

Russia retaliated by pursuing an Asiatic policy, which caused us to go to war with Afghanistan the next year, and resulted in intense Russo-British military and naval rivalry.

In 1879 Germany and Austria concluded an Alliance aimed at Russia, which was joined by Italy in 1882, and the immediate result of all this new direction of policies was an enormous acceleration of armament preparation.

Military Armaments in the Early "Eighties"

In 1872, Russia had undertaken a complete re-armament of her artillery, at a cost of 28,250,000 roubles, and had overhauled her small arms factories at Toula. A great volume of work in connection with this came to Messrs. Greenwood and Batley, of Leeds, who have always maintained an extensive business with the Russian Army and Navy for the supply of machine tools. After the Berlin Congress, Russia began to strengthen her resources and to renew her armaments on a bigger scale. The great works at Obouchoff were extended and improved, whilst Baird's erected another new works at Petrograd. Greenwood and Batley had a considerable share of the machinery orders and contracts for presses, etc., for Obouchoff.

In 1879, Austria reorganised her artillery and provided a number of new batteries. These were ready in 1881. This re-armament, which was on an extensive scale, provoked Russia and Italy to further efforts, both commencing new preparations, of course, for defence. Russia proposed to expend 50,000,000 francs, and spent much of this in rendering herself independent of Krupp and other German firms, now that Germany had concluded an Alliance with Austria.

In 1875 Italy had commenced the construction at Terni of an arms factory for making of rifles, revolvers, lances and swords, and this was ready for work in 1880. Following on her naval budgets, to which we shall refer later, and her acrimonious difference with France in reference to Tunis and the Soudan, Italy brought forward in 1884-85 an eight-year war budget of 215,435,000 francs. This was divided into sums for various arms :—

23,400,000	francs	for small arms.
4,785,000	,,	,, field artillery.
20,000,000	,,	,, fortress artillery.
19,600,000	,,	,, coast artillery.
57,500,000	,,	,, shore defences.
25,500,000	,,	,, fortresses.

Part of the twenty-six batteries of field guns, 1,200 pieces of fortress artillery and 150 howitzers of 11½ inches was the first fruits of military demand which fell to the Armstrong Works at Pozzuoli.

In 1884 Austria adopted an improvement of the Mauser rifle, made at the Werndl Arms Factory, which had been incorporated at Steyer in 1869 as the Oesterreichische Waffenfabrik, and which already made four types of military arms, selling them in Austria, Germany, Greece and France.

The Steyer works were kept busily employed on the new rifle over a period of three years till 1887.

These extravagances in Russia, Austria and Italy all contributed not merely to the encouragement of the munitions and contributory industries in the three countries directly affected, but also stimulated demand abroad and gave to the French armament interests a greater incentive to press for the right to export material to foreign countries. The partial alienation of the Russian Government from German supply sources held out new prospects to the French, whilst the vast programmes of Italy called for renewed exertions on their part.

The influence of these new armament schemes on the explosives and arms industries of Germany and Britain we shall see in a later section.

Naval Armaments in the Early "Eighties"

We have already noted some of the factors which were responsible for the armament policy of France and the growing rivalries between the two foremost maritime States in the natural anxiety of our neighbours to repair the deficiencies of their naval defence occasioned by their absorption in military entanglements, in the ambitions of their new created war trades and their expanding shipbuilding industry, as well as in the contrary interests of French and British Colonial policy.

The determination of the British Government not to be checked in its Egyptian schemes by any outside interference, together with the feeling of annoyance and discontent at the continued naval preparations and Asiatic intrigues of Russia, was further stimulated to find expression in naval expansion by the restless activities of W. T. Stead, Arnold Forster, and Lord Charles Beresford. A period of acute depression in the shipbuilding and engineering trades further shook the pacifist feeling of the great industrial centres and made them turn to the opportunities of work and profit afforded by naval orders.

In 1884 began that sinister form of unemployment relief administered henceforward at regular intervals by the Government in the form of Admiralty extravagance. Originally provided in order to tide over an interval of bad trade, this form of State relief work became continuous, and only served to aggravate the problem which it had been instituted to solve.

A careful study of the technical and trade literature of the early "eighties" makes quite evident the influence on armament policy of bad trade in the shipping and engineering branches of industry. It was this made possible the success of the naval agitation which would otherwise have broken in vain against the Radicalism of such centres as Birmingham, Sheffield, Tyneside, and Clydeside. Henceforward economic interests were going to clash with the political ideals of those who were strongest in their Liberalism, whether employers or workers. This is a fact which has been far

too often neglected by pacifists and others who have sought to explain or even understand the strength of modern Imperialism. The construction of a great steel navy has been of enormous value to our engineering firms, and has completely shattered their antagonism to this imposition of the burden of armed force.

This truth the writer would affirm and re-affirm until it has sunk deep into the political consciousness of everyone of his readers.

Now we must note the more important technical changes which at this time were revolutionising naval architecture and calling into use new sources of armament supply. So drastic were they as to be absolutely epoch-making in effect on the naval programme of the whole world, and called new navies into existence often with the most far-reaching consequences.

The wrought-iron armour devised in the "sixties" had become so ponderous a shield wherewith to protect the battleship from the sledge-hammer blows of Armstrong's monstrous 110 ton muzzle-loaders and Whitworth's conical shells, that gun power had to be sacrificed to retain the other vital necessity of speed. Therefore, the armour makers had to produce a thinner but stronger plate, which would give as much strength for a less weight, and Cammell and Brown brought out a new plate compounded of iron backing and steel face, whilst Schneider invented an all-steel armour. This resulted in the temporary discomfiture of Armstrong and Krupp, but, using an improved German slow-burning powder, which exerted its energy along the whole barrel and not merely at the point of ignition, the gunmakers perfected their breech-loaders, and routed the armour manufacturers.

Armstrong, supremely contemptuous of armour, began to build unarmoured ships, swift and heavily armed, which he stated would render the armoured battleship *hors de combat* in a very short time —the British Fleet consisted of such vessels. Hence, a technical and professional demand for the construction of warships carrying Armstrong breech-loaders. The new guns were placed on new and intricate hydraulic mountings devised by a member of the Armstrong firm, and from that day to this naval gun mountings, except for small pieces, have been made exclusively by the trade. The official story, as told in the words of two ex-Admiralty constructors, is that Armstrong's erected a mounting with two great guns at their own expense, and then invited the whole Board of Admiralty down to Newcastle to have a look. The Board came, saw, and was conquered. To use the very words of Sir E. J. Reed, the Admiralty had " fallen into the hands of Mr. Armstrong's firm," and Mr. Armstrong's firm made them pay the piper.

The "scare" programme of 1884 comprised one battleship designed and built at Newcastle, the ship subsequently described by Lord Sydenham as "the worst designed armour-clad ever built,"

and a number of cruisers after the Armstrong pattern all armed with Armstrong guns and mountings.

These ships were no sooner well in hand than the French abandoned battleship construction, and began to build torpedo boats by the score, after the manner of Germany and Russia.

The torpedo boat was the device of Thornycroft, of Chiswick, and Alexander Fernandez Yarrow, then of Poplar, and now of Yoker. It was a boat specially constructed to use the new and improved Whitehead "fish" torpedo. It was a boon to poverty-stricken nations, and the tiny craft was advertised as the doom-bringer to all battleships.

At the very time when we were on the verge of war with Russia, Mr. Yarrow designed and engined 110 boats for that Power, and subsequently built her two more boats of this kind. One of the Russian torpedo boats was actually taken over by the Admiralty as she was about to leave the Thames.

In 1884, with Lord Charles Beresford in the chair, Mr. Yarrow pointed out to a semi-public meeting in London the peril of our lack of torpedo boats, in view of Russia's great flotilla of 115 boats—and he was the designer of 112! He pointed also to the torpedo fleets of France, Germany, Spain, Italy, etc., and recited a jeremiad over our impending ruin.

In the next two years his firm received orders for nearly 50 torpedo boats, and others were obtained from the Clyde, Tyne, Mersey, and Cowes—but *not one* from a dockyard.

In 1886 it was discovered by the French on manœuvres that the torpedo boats were too small, and liable to be swamped. Britain experienced similar qualms, and then began to build torpedo-catchers of 1,000 tons, which, when it was pointed out that they would probably have no torpedo boats to catch, were next described as torpedo boats which would not be swamped. When *they* were tried in turn they were found to be too large, and to afford too much of a target. For, meanwhile, Armstrong's had found yet another explosive, smokeless powder, and utilised it as the charge for a new quick-firing gun which should destroy the unarmoured and helpless torpedo boat as it dashed towards its mighty victim.

So the battleship came to its own again, replete now with heavy breech-loading and light quick-firing guns, with improved armour, and escorted by torpedo catchers, with a cloud of torpedo boats and attendant squadrons of Armstrong's improved cruisers. In fact, every type was adopted, and none was absolutely rejected. On both sides of the Channel it was decided that no chances must be taken, and there was a vested interest in armour, another in guns, a third in cruisers, and a fourth in torpedo boats—each and all ready to assert its own indispensable value.

Armstrong and Whitworth stood for heavy guns, and Armstrong for heavy mountings and quick-firing guns; the Maxim

Gun Co. and the Nordenfeldt Gun and Ammunition Co., and the Hotchkiss Ordnance Co., were purveyors of quick-firers and machine guns; Yarrow, Thornycroft, Palmer, Laird, Hawthorne, Leslie, and others, provided torpedo craft; and J. and G. Thompson (Clydebank), the Fairfield Co., Palmer, and other shipbuilders, saw a treasure of priceless value in cruiser construction, whilst John Brown and Co., and Charles Cammell and Co., were not going to see armour plate sacrificed to any economist whims.

The same thing was going on in France. Meanwhile, in the year 1885, the French Parliament legalised the export of war material.

For several years Britain had been pursuing a policy hostile to French Colonial ambition. Her War Department had not hesitated to call in German explosive makers to instruct its Chief Chemist in the preparation of a new military powder, and, in the previous year, Britain and Germany had displayed signs of activity in Italy of the most alarming nature.

Senator Brin, the Italian Minister of Marine, had (we have it on the authority of the "Naval Annual") requested Gio, Ansaldo and Co., of Genoa, to enter into partnership with Maudslay Sons and Field, Chief Marine Engineers to our Admiralty; had caused the Societa di Terni to undertake the manufacture of armour-plate, and had invited Sir W. G. Armstrong to establish an ordnance factory at Pozzuoli, near Naples. These new works requiring a resident manager, Mr. Rendel, an Additional Sea Lord of the Admiralty, resigned his position in Whitehall and went to take up the vacant appointment. Meanwhile, Messrs. Schwarz Kopf, of Berlin, were called in to erect torpedo works at Venice.

Next year, the French set free their armament firms to push their trade in every land, and the Chantiers de la Méditerrannée commenced the construction of a cruiser for Spain before the law was actually passed.

At once Armstrong, Mitchell and Co. despatched their famous commercial traveller, Mr. Robert Lawrie Thompson, described as a "private ambassador," to Madrid—but he came back empty-handed.

In 1886 M. Bertin was sent from the Quai d'Orsay to act as naval adviser to Japan, and from 1887 to 1890 all Japanese ships were of French type, the Krupp guns were discarded, torpedo boats were ordered from Schneider instead of from Schichau, of Stettin, and Germany lost a good little customer to France. The French next turned their attention to Chili and Brazil and there poached with considerable success upon the preserves of Armstrong, Mitchell and Co. Thither Armstrong sent Mr. R. L. Thompson in 1890, with a promise of 2½ per cent. on cost of hulls and engines, and 5 per cent. on ordnance, etc., for which he might obtain orders.

In 1891 Armstrong, Mitchell and Co. booked an order for a cruiser, and ousted their French rivals.

More important than these minor economic skirmishes was the entry of French armament capital into Russia. France had soon discerned that the antagonism of Russia and Britain and the jealousy of Germany latent in Russian Army circles might provide her with a possible comrade-in-arms upon the eastern frontier of her hated Prussian foe and at the gates of India. It is generally acknowledged that a desire to obtain Russia's friendship prompted French export of capital and armaments. Russia, above all, was in lack, more even then than later, of munitions. She needed to develop her resources, to estab ish iron and steel industries, to erect iron foundries, etc.

Over a period of fifteen years—from 1880 to 1895—French capital steadily fertilised the iron and coal fields of Russia, and French mechanics assisted in the equipment of ordnance and shell factories. At Kolpino, Perm, Obouchof, Nikoliaev, Toula, Sestrovetzk, Igeosk, Poutiloff, Petrovsky, and other great armament, iron, and steel works, both State, semi-private, and private, French influence became more and more effective, whilst Chatillon-Commentry, Schneider, the Chantiers de la Méditerrannée, and other French firms exported vast quantities of munitions to Russia.

This reversal of French armament tradition had four main results :—

(*i.*) It prepared the way for an alliance of French industrial resources and the Russian military hordes.

(*ii.*) It presented both Britain and Germany with alarming difficulties, the one on the sea, the other on the land.

(*iii.*) It struck a desperate blow at the Krupp land armament monopoly and at the development of German naval shipbuilding industries.

(*iv.*) It threatened the British firms, especially Armstrong, Mitchell and Co., with fierce competition on the naval armament market.

The Endowment of our Armament Firms

THE CONTINUANCE by the Italian Marine of the policy of battleship construction in face of that school of experts who foresaw nothing but calamity for the big ship when encountered by the torpedo craft, and the absolute failure of the French flotillas of torpedo boats during the Mediterranean manœuvres of 1886 resulted in a renewal of armour-clad construction in France. The recently completed big-gun battleships "Italia" and "Lepanto" were followed by three more colossal efforts whose Armstrong monstrosities seemed to threaten Toulon and Bizerta. In April, 1888, there was a war scare between these two nations, which was used to inflame the generous heart of Britain for her weak friend beyond the Alps threatened by the chauvinism of France. In the following autumn a new panic programme was outlined by the British extremists, who demanded the immediate construction of six battleships, sixty large cruisers, and swarms of colliers to cost 20 million pounds.

Our naval expenditure on new construction had shown a steady decline from 1886 to 1888, but it was still 46 per cent. above the level of 1878. Over a period of six years it had been 75 per cent. above the level of the French, and was much higher than the combined outlay of France and Russia. Nevertheless, in the spring of 1889 Lord George Hamilton capitulated to the scaremongers and brought in his Naval Defence Act, which should really be described as an Act for the Endowment of the Armament Firms.

The new measure provided for :—

8 first-class battleships.
2 smaller battleships.
9 first-class cruisers.
33 smaller cruisers.
18 gunboats.

Of these the following were to be built in private yards :—

4 first-class battleships.
5 first-class cruisers.
17 smaller cruisers.
6 gunboats.

The whole programme was to be completed in four and a half years. The vote of £10,000,000 for contract work was borrowed from the fund created by the profitable conversion of Consols in the previous year, which financial change, there is reason for believing, was partly carried out for such an end as this. Another £11,500,000 raised by taxation was to be spent on dockyard work.

The entire contract work was to be given out at once and without delay. The First Lord gave his reasons for this as follows :—

> "It was evident early last year that it would be our duty to submit a shipbuilding programme to this House *to take the place of the Northbrook programme, which is practically complete.*"

Yet Northbrook had emphasised that his programme was a temporary expedient which would not need to be repeated !

Let the reader remember the efforts of France and her firms to break the Armstrong, Thames and Thompson hold on neutral markets, and the marked, though temporary, success of this policy, and weigh carefully these words of Lord George Hamilton in excusing the immensity of his scheme :—

> "We have so framed our scheme as to bring into world-wide prominence the incomparable power of this country and its enormous resources. The scheme which I have laid before the House is one which I do not think all the dockyards of Europe would complete in the time we propose. . . ."

And how is this, think ye, for a display of trident flashing ?—

> " . . . and if there are any nations abroad who do wish to compete with us in naval armaments, the mere enunciation of this scheme will show to them the utter futility of their desire."

Unfortunately, this prophet was as self-deceived as his predecessor, Northbrook, for in 1894 (1889 plus $4\frac{1}{2}$ equals $1893\frac{1}{2}$) the builders and armour-plate vendors were howling like a pack of wolves around Lord Spencer. Rather than surrender—and to his eternal credit—Gladstone went into retirement and left Rosebery and Spencer to allay the greedy maws that yawned for gold, and Harcourt, with his death duties, to find the wherewithal.

The 1894 programme comprised seven battleships and six cruisers, of which two battleships and all the cruisers were given out to contract. In addition, there was a fleet of torpedo-boat destroyers to be constructed—all by private enterprise. The entire armament, machinery, and armour of all the ships of this, as of the 1889 and 1884 programmes, were given out to contract.

Liberals, attention! Sir William Harcourt speaks:—

> "If we had been free from the new debt (naval), and if the naval expenditure stood at the expenditure of last year, there would have been £747,000 available for the reduction of taxation. We should neither have had to deal with a deficit nor to impose new taxation. . . . What we shall have to meet by increased taxation is £2,379,000."

The deficit was £4,502,000, and of this the Admiralty was responsible for £3,126,000.

Conservatives, Mr. Goschen!—

> "He would be perfectly frank and admit that if he had known that the naval programme of the Defence Act was not to be an exceptional programme he might not have taken that particular financial step. The late Government did consider that programme was an exceptional effort. They were wrong; but at that time no one thought that it would be necessary for the Government to come forward with their present proposals."

What a confession of ineptitude! What a volley of dust!

"At that time no one thought. . . ." One wonders if *no one* thought! Not even these noble lords, who in 1889 were shareholders in Armstrong, Mitchell and Co., Ltd.?—The Marquis of Salisbury (a shareholder in trust); the Marquis of Lansdowne, £20,000; Lord Middleton, £10,750; Lord Sudeley, £44,800; the Duke of Sutherland, £2,000.

Nor these directors and shareholders of the Naval Construction and Armament Co., Ltd., of Barrow-in-Furness:—The Marquis of Hartington, M.P. (chairman), £6,000; Lord Brassey (deputy-chairman); Lord Edward Cavendish, M.P., £5,000; Lord Revelstoke, £25,000; and Lord Rothschild, £11,185.

Three Ministers of the Crown, and one of them a director and chairman of a firm which did extraordinarily well out of the Act, paying 8 per cent. in 1890 and 1891 and 6 per cent. in 1892, did these not think nor forecast the stars that swing in the courses of Capitalism?

The years between 1883 and 1888 had witnessed a remarkable growth of armament firms in this country as elsewhere.

In 1882 Sir W. G. Armstrong and Co. had amalgamated its

gun and steel works with the shipyard of Charles Mitchell and Frederick Swan, shipbuilders of Low Walker-on-Tyne, and united the two enterprises as Sir W. G. Armstrong, Mitchell and Co., Ltd. In February, 1883, the new company absorbed the London Ordnance Works of Mr. Vavasseur, and took him on to the Board. The Admiralty loaned them Mr. W. H. White, Assistant Chief Constructor, to lay out their Elswick Shipyard, and whilst he was with them he designed 30,000 tons of warships, two-thirds of them for foreign Powers. In 1885 he returned to Whitehall, and was succeeded by Mr. Philip Watts, who had also an Admiralty training. In 1885 Armstrongs joined with the Dueneberg Powder Works and the United Rhenish Westphalian Powder Mills in the formation of the Chilworth Gunpowder Co., Ltd., who then took up the manufacture of powders suitable for breech-loading and quick-firing artillery.

Under the Naval Defence Act, the Admiralty gave large orders to Armstrongs for quick-firing 6-inch and 4.7-inch guns, concerning which *Engineering* said: "The results of which are very plainly visible just now in the Elswick shops." They formed the main armament of the fifty-nine cruisers provided for in that measure. This firm received practically all the gun-mounting contracts for the 1889 programme, and £580,000 of similar orders in 1893-94, as against £143,800 for the Arsenal and all other factories.

Vickers, Sons and Co., Ltd., of Sheffield, who had long supplied gun steel to Elswick, the Arsenal, France, Austria, and other foreign Governments, had received a windfall when, deprived of their contract for the repair of the Tay Bridge, they obtained handsome compensation for the rolling mill and heavy plant they had installed. With this cost-free installation, they set out Knight-erranting for contracts, and found a distressed maiden, Britannia, in need of guns and armour, beset by a dragon, Armstrong, Mitchell, and a two-headed monster, Brown and Cammell.

Together with Thomas Firth and Sons and Charles Cammell and Co., they petitioned the authorities to have pity on them. They had put in plant to make 12,000 tons of forgings when only asked for 5,000 tons; they had finished their material to a degree they had not been invited to do; their works were better situated, strategically, than Woolwich; they had been starved of orders; they had put in mills and plant at the request of the Government; they pointed to the shortage of guns and the unproductivity of their capital; they remarked on the policy of France and America in relying on the private trade. "Baksheesh! Baksheesh!" they wailed.

Thus they were answered by the Director of Contracts:—

"I am to remind you that the principal points upon which

you now insist were mentioned . . . at the meeting in the Secretary of State's Room on the 7th February, 1887, and were fully considered by him. It was admitted at that meeting that *the special expenditure incurred by Messrs. Vickers had been commenced before any arrangement was proposed by this Department for increasing the then existing means of production,* and he conceives that the statement that 'we have very largely increased our plant. Our united expenditure on that account nearly approaching £350,000,' is an exaggerated one."—*Steel Manufacturers, Sheffield. Army Paper,* 1888.

That was pointed.

However, they received an order for £250,000 of armour from the Admiralty in 1887, and next year made their first naval guns. The Government was dissatisfied with the Armstrong weapons and the Armstrong prices, with the Brown and Cammell armour and the Brown and Cammell price. So entered Vickers, and for a while prices fell, and there was a real saving to the Treasury. But it was a desperate resource to call in another armament firm, who soon learned to whine and scratch and then to growl and snap as fiercely as the others, until at last they all joined forces, and finally went off to play with Krupp and Schneider at "catch every patriot's penny."

In 1890 William Beardmore and Co., Ltd., of Parkhead Forge, made their first successful armour and received large orders under the Defence Act.

Meanwhile the Maxim Gun and Ammunition Co., Ltd., had been formed in 1884 to exploit the maxim gun patents, and their first share list discloses the real owners—Albert Vickers, Thomas Edward Vickers, George Naylor Vickers, Edward Vickers, and Gertrude L. Vickers, as well as Hiram Maxim. Later on, Ernest Cassell also became an owner. In 1888 the Maxim-Nordenfeldt Gun and Ammunition Co., Ltd., amalgamated interests in Sweden, Spain, and this country with a capital of £1,400,000. The same year saw the birth of the Naval Construction and Armament Co. under Cabinet and Royal patronage—the Duchess of Albany not remaining a shareholder.

More ominous still, the Hotchkiss Ordnance Co., Ltd., had been incorporated in 1887 to sell machine guns to France and Britain on either side the Channel. Theodore Favarger, Christian Koerner, and Jacques Creuzé de Latouche joined with Major-General G. de la Poer-Beresford, Sir Donald Currie, Vice-Admiral Jonquieres, Lord Eustace Cecil, Stanley A. C. Clarke (equerry to the Prince of Wales), W. I. Ingram (proprietor, *Illustrated London News*),G. P. H. Villiers (British Military Attaché, Paris), and the Countess Howe to share the booty.

The Naval Defence Act, the mere enunciation of which was to show to all nations the utter futility of their maritime ambitions, was a lamentable failure only to be paralleled by the "scare" programme which followed it five years later. As a check to the growth of foreign Navies it was worthless and had only the effect of immediately stimulating France and Russia to renewed efforts.

The French brought in Supplementary Estimates for £2,320,000, and in the following year made provision for three first-class and three second-class battleships, again swelling their expenditure by nearly £3,000,000.

The Russians increased their expenditure from £4,311,350 in 1890 to £6,376,250 in 1896, and called in more French capital to assist them. In 1889 a Franco-Polish-Belgian group opened up iron mines in the Dnieper basin; in 1891 another company erected the Drougskovsky Works; in 1895 La Société Metallurgique Russo-Belge (really Franco-Belgian) built the Petrovsky Steel Works, and another French company erected the Doietzko-Gouriefski Works. A French squadron visited Kronstadt and a Russian fleet returned the call at Toulon. In 1891 the two countries became allies and presented this country with the very menacing problem of Franco-Russian military and naval aggression.

Events in the Far East were becoming sufficiently disturbing. France was making difficulties for us in Siam and Indo-China, Russia was encroaching on the borders of India, and from 1895 onwards was pursuing a policy of penetration and absorption in Manchuria and Mongolia. The startling victories of the Japanese over China had aroused Russia to the possibility of a new rival in the East where Japan was steadily developing her sea power. Most alarming to Russia was the fact that her ally, France, had been ousted from favour in Tokio in 1890-1891, and all the new Japanese warships were being built in this country. Meanwhile, German firms, German mechanics, and German military experts were busy upon the perfecting of the Japanese Army. Whilst Germany had manifested her diplomatic solidarity with France and Russia in preventing the Japanese continuing their occupation of Port Arthur, there could be no mistaking the meaning of the intimacy between British and Japanese diplomacy and naval expansion.

The expenditure at home and abroad on the development of Navies, the renewed vigour imparted to shipbuilding enterprise by the Naval Defence Act, and another turn of the wheel of invention, all contributed to the extension and consolidation of naval armament interests in this country and in France.

The Armstrong cult of the swift cruiser had soon gained a great vogue among the nations. The application of the quick-firing principle to the medium-sized gun, improvement of marine engines and boilers adapted to naval requirements, the possibilities

of combining cheapness with destructive capacity which the abandonment of armour afforded had all made the cruiser popular with the poorer nations. Whilst the cruiser could not engage the battleship it could easily out-distance it, and the presence of a swarm of cruisers on the trade routes became the bogey wherewith to frighten John Bull.

Lecturing to the London Chamber of Commerce in 1893, Lord Charles Beresford pointed out that whilst France had one sloop or cruiser to every thirty ships of more than 1,000 tons, this country had only one to every seventy such ships. He enlarged on the insecurity of our Mediterranean shipping and urged on the mercantile community that

> "the sooner our weak spots would be exposed and our country freed from those periodical panics so extravagant to the nation and so prejudicial to commercial interests"

the better it would be.

Even as he spoke, the last cruiser built under the Naval Defence Act was approaching completion at Blackwall.

When we recall that five first-class and seventeen second-class cruisers had been allotted to the contractors in 1889, and that the entire machinery for forty-five cruisers built in five years was given to the private firms, we can judge of the pressure that was being brought to bear to obtain yet more of these ships.

In 1894 sixteen large cruisers were ordered, a dozen from the private yards, and of these two were placed with the Fairfield Co. and two with the London and Glasgow Co., of Govan. Eight of the newly devised torpedo-boat destroyers and one batttleship were also placed with Clyde builders.

Whilst Elswick was the natal place of the cruiser, it was the Clyde which became its very home. For some reason or other the Government refused to order cruisers from Elswick, whose products for ten years—from 1889 to 1899—were turned out almost exclusively for minor Powers, such as Japan and the South American Republics.

One reason for this, probably, was that Armstrong, Mitchell and Co., Ltd., were ordnance manufacturers primarily and shipbuilders second, whilst they did not undertake the construction of marine engines. The Government still built most of its own battleships; torpedo craft were never Elswick's line, and when the Admiralty wanted cruisers it wanted swift, lightly-armed *cruisers,* and not cheap, swift battleships, as the foreign cruisers really were.

Now, J. and G. Thomson, of Clydebank; the London and Glasgow Shipbuilding Co., of Govan, and the Fairfield Shipbuilding Co. had a well-earned reputation, each of them, for marine engineering, and it was to them, and particularly to Thomson's,

that the Admiralty turned for its cruisers. The "Terrible," one of the mightiest of all the unarmoured cruisers, was built at Clydebank, and from cruisers Thomson's yard was promoted to the construction of battleships. Spain and Japan were both good customers in these years. Clydebank built seven gunboats for Spain in three months in 1895; the cruiser "Chiyoda" for Japan in 1890; then the battleship "Asahi" in 1897; the battleships "Ramillies" in 1891 and the "Jupiter" in 1894 for the British Admiralty.

The London and Glasgow Co. was very prosperous during this period, and the Naval Defence Act was the absolute making of the Fairfield Company as naval contractors. Then these three companies, together with William Denny and Brothers, fell heir to the destroyer "boom."

Even as the great gun made the Tyne, so the mighty pulsing machinery which thunders in the vitals of the cruiser made the Clyde the home of the modern warship.

Meanwhile, in America, Mr. Augustus Harvey had invented his new process for the cementation of armour-plate, and by 1893 the Harvey Company of Great Britain, the Société des Procédés Harvey, and the Harvey Continental Steel Company had made Harvey's method the common property of all the great armour makers. The new process had completely re-established the prestige of armour, and new squadrons of battleships were being constructed plated with Harvey armour. The ill-fated "Majestic" was the first battleship in our Fleet to be given a suit of "Harveyised" steel.

William Beardmore, of Parkhead, had begun the making of armour-plate in 1890, and had devised some adaptation of Harveyising methods. He had obtained considerable orders throughout the "nineties," when the Admiralty had difficulty in satisfying its requirements either in quantity or price.

By 1898 another twist of the whirligig brought the armoured cruiser—a ship which combined the peculiarities of the Armstrong cult with the improvements since effected in the Brown-Cammell fashion shop and made still better by some new devices of the Vickers' genius.

The new ship combined gun-power, armour-protection, and engine qualifications. She converted Armstrong, Mitchell and Co., Ltd., now Armstrong, Whitworth and Co., Ltd., to a crusade for armour-clad construction, and the installation of enormous armour manufacturing plant at Manchester.

In September, 1898, John Brown and Co., Ltd., the armour-plate manufacturers of Sheffield, purchased the Clydebank Shipbuilding and Engineering Co., Ltd. (late J. and G. Thomson and Co., Ltd.), and combined the enterprises of armour manufacture and cruiser construction. It was the reply of the armour makers

to the amalgamation of the gun and armour makers, Vickers, with the Naval Construction Co., of Barrow, and the resolution of Armstrong, Whitworth and Co., Ltd., to put down armour-producing plant.

The interests of Sheffield and the Clyde were fused at one point.

The more one comes to ponder the problems of modern naval architecture and economics the greater is the place one feels bound to assign to the genius which has more than once been conspicuous in the personnel of the Armstrong Company. This firm was especially responsible for the continued improvement and utilisation of the quick-firing gun, and by its very insistence on the superiority of gun power over armour protection, stimulated the steel manufacturers of Europe and America to further experiment and research, with results in industry more far-reaching than have been generally realised.

The adoption of quick-firing guns of remarkable accuracy completely transformed the Navies of the world. It became imperative to obtain some kind of armour protection which would stay the fusillade of light shell which now threatened to rake the unprotected parts of a heavy warship and so hinder its manœuvring and fighting powers. Hence, the steelmakers went to work so to improve their shields as to combine lightness with strength and relative economy of cost.

In 1888 Vickers, Sons and Co., Ltd., came forward with a new steel armour, and obtained a place as Admiralty Contractors for armour-plate. Shortly afterwards, William Beardmore and Co., Ltd., also entered the lists. Moreover, Vickers were gun-makers as well as producers of armour, and thus had superior opportunities and a greater incentive to counter gun by armour and armour by gun. They were a new firm to the armament trade and had to contend against Armstrong on the one hand and Brown-Cammell on the other. They were carrying on economic warfare on two fronts at the same time.

Meanwhile, in the United States the Navy Board was trying to obtain satisfactory armour of native manufacture, and had induced the Bethlehem Ironworks, and then Carnegie, Phipps and Co., to instal armour-producing plant. Mr. Harvey, of the Harvey Steel Company, of New Jersey, invented a new process of hardening steel plate, which was adopted progressively by the United States and other nations to the virtual exclusion of other systems except that of Captain Tresidder, of John Brown and Co., whose company compounded with Harvey in order to avoid further litigation and disastrous competition. The Harvey plates were much superior, weight for weight, to the compound or even the older steel armour, and enabled a warship to carry a greater length and width of belt for the same tonnage and cost as had formerly been needed for a much inferior defence.

The Harvey process was quickly adopted by Vickers, Brown, Cammell, and Beardmore, and the Harvey Steel Company of Great Britain was formed in 1893 to take over the rights and draw the royalties for this country.

Amongst those who appeared in the preliminary arrangements were :—Lord Cairns, Lord Elphinstone, two Admirals (one the greatest scare-monger of his time), magnates of the Low Moor Ironworks, the Dowlais Ironworks, and other iron and steel concerns. In the first prospectus much importance was attached to the favourable reception of the plates, alike by the British and Russian Admiralties, and an official testimonial given by the First Lord was effectively used as a financial "puff."

In 1894, soon after the British Admiralty had ordered 17,000 tons of Harveyised armour for the new "scare" programme, and when the Russians, French, Germans, and Italians had also adopted it, the Harvey Continental Steel Company was incorporated. These were its first directors :—

Charles Cammell.
Charles E. Ellis (John Brown and Co.).
Edward M. Fox (Harvey Steel Co. of New Jersey).
Maurice Gény (Schneider et Cie.).
Léon Lévy (Chairman—Chatillon-Commentry Cie. of France).
Joseph de Montgolfier (Compagnie de la Marine et des Chemins de Fer—France).
Joseph Ott (A. G. Dillinger Huttinwerke—Germany).
Ludwig Klüpfel (A. G. Friedrich Krupp).
Albert Vickers.

And this was in the days when France and Russia were our fiercest naval rivals and when these two nations were contesting with Germany for military pre-eminence. But scarcely were the Harveyised armour-plates the accepted fashion when Emil Ehrensberger perfected the superior Krupp cementation process in 1896. Next year the British, French, and American companies were permitted to share the lucrative secret, and the Harvey companies socialised the new method in the interests of the armament international.

The cost of the new installation was enormous and so was that of the new armour, but the nations paid up cheerfully and the firms suffered no inconvenience, but speedily found the ample reward of genius.

The Harvey armour soon brought the armour-clad battleship back to favour, even greater than ever, and greatly encouraged the building policies of the Powers. France and Russia, now co-operating in extravagance, and Japan steadily adding ship to

ship, contributed to the prosperity of the armour-plate manufacturers of Britain, France, and the United States.

Vickers, Sons and Co., Ltd., John Brown and Co., Ltd., Charles Cammell and Co., Ltd., William Beardmore and Co., Ltd., and Schneider et Cie., experienced remarkable prosperity. Meanwhile, the cruiser cult was proving a great boon to the Naval Armament and Construction Company, of Barrow; to the Clydebank Shipbuilding Co., Ltd.; to Laird Bros., of Birkenhead, and the Fairfield Shipbuilding Co., Ltd., in this country; and to the Chantiers de la Méditerrannée and the Chantiers de la Gironde in France.

Armstrong, Mitchell and Co., Ltd., was doing extraordinarily well out of the spendthrift naval outlay of South American Republics, Italy, and Japan, as well as from its monopoly of gun-mounting machinery plant in Britain.

Then in 1894-5 came the Chino-Japanese War and the Battle of the Yalu River, which clearly demonstrated the weaknesses of the unarmoured cruiser. Theory and practical experience alike determined the British Admiralty to give the swift cruiser an ample suit of armour, whereupon Vickers amalgamated with the Naval Construction Company and laid out an immense shipyard and gun-mounting plant at Barrow-in-Furness; Armstrong, Mitchell and Co., Ltd., retorted at once by absorbing Whitworth's, of Manchester, and putting down armour-plate plant, whilst John Brown and Co., Ltd., purchased the Clydebank Company and brought the armour of Sheffield to the cruiser yards of the Clyde.

Krupp leased the "Germania" shipyard at Kiel, and Schnieder et Cie. joined forces with the Chantiers de la Méditerrannée and with the other shipbuilders of the Gironde.

All these amalgamations took effect in the three years, 1896, 1897, and 1898. They were the result of the technical changes explained above, of the enormous prosperity brought to the British and French firms by the naval rivalries of 1888-1895 and the forecasts made on the results of the Chino-Japanese War and the new naval problems confronting Russia and Britain in the East, Germany in the Baltic and the North Sea, Italy in the Mediterranean, and the United States on the Spanish Main.

Science and Military Armament

THE TREMENDOUS outlay which the Continental Powers made on the armament of their military artillery has not received much attention in Britain because, of course, with our small standing army, our requirements were never such as to develop a permanently vigorous manufacture of military material. But, properly to understand the development of the foreign industry of war it is necessary to have some acquaintance with this very important supply trade.

One might almost say that military ordnance as an arm of power and efficiency dates from the period of experiment and research in explosives, and the co-ordination of gun and powder manufactures. The chemistry of explosives for war purposes has been of the greatest influence in the development of mineral and other fundamental resources of modern industry. It is certain that the supremacy of German dyes is not unconnected with the incessant endeavours of her scientists to produce the finest ingredients and combinations of military explosives.

The requirements of military "preparedness" resulted in a very high development of the machine-making trade of Germany about the small arm and artillery manufactures. Similarly, the necessity of accelerating the rate of discharging projectiles made it essential that the explosives trade should be adequately capitalised, well organised, and closely connected with the armament and machinery manufactures. So, for instance, it has come about, in time, that the Chilworth Gunpowder Co., was the chief owner of the British representative of the Daimler Motoren Gesellschaft.

In France and Austria the same tendencies were apparent, though nowhere has the intensive organisation of the war trades—trades which are often vital to peaceful production—proceeded so far as in Germany.

German militarism has won its victories by the sheer weight of metal and energy of high explosives, for which it must thank Löwe and Nobel and Duttenhofer and Daimler as much as Krupp and Mauser. All these capitalist groups have locked and interlocked with one another, and all derived their financial dynamic from the great banks, themselves intimately associated and work-

ing harmoniously to achieve the purposes of the Fatherland, which they so largely dominate.

Soon after 1870-71, the explosives manufacturers of Germany appear to be co-operating with Krupp to produce a propellant which should exert a greater force along the gun-barrel and less at the breech, thus giving greater velocity to the shell and causing less wear and tear at the most vulnerable part of the weapon. The British War Office had abandoned the Armstrong breech-loading field gun because of the inability of its inventor to supply a satisfactory breech lock, which should withstand the violence of the discharge. The Germans who had followed our example in adopting the breech-loader had not abandoned it, but were by no means pleased with the action of the new method. Hence, all these experiments with powder and mechanism. In 1875 the new "cocoa" powder was produced, to be introduced into this country in 1881, when the Duttenhofers and Heidemann were asked to undertake its manufacture for instructional purposes at the War Office factory at Waltham Abbey. With the new powder, such results were obtained as to cause the Admiralty and War Office to adopt the new Armstrong and Woolwich breech-loaders, both for sea and land services. In 1883-84, the British Army was provided with field guns on the new system.

In 1885, Armstrong, Mitchell and Co., Ltd., together with Carl and Max Duttenhofer took over the gunpowder works at Chilworth in Surrey, and formed the Chilworth Gunpowder Co. Ltd., with Lord Sudeley as chairman and the Duttenhofers and Lieut.-Colonel Tulloch as directors, to make the new explosive and to produce improved military and commercial powders. All the artillerists of Europe were, at this time, endeavouring to devise a quick-firing gun for use in the field, and a naval quick-firer to drive off the tiny torpedo-boat, a mosquito-craft too small and speedy for the larger gun to tackle with its slow and ponderous discharges.

Nordenfeldt had invented a machine gun in the late "70's," but this was too light a weapon, and then, a few years later, Hiram S. Maxim applied his breach mechanism to a Winchester rifle, and so produced his famous automatic rifle gun. This he patented in England in 1884, and commenced manufacture in London with the aid of the Vickers family, who really controlled the Maxim Gun and Ammunition Co. Ltd. Hotchkiss, Palmkrantz, and other foreign makers were being successful with machine rifles, and then Nobel, the Chilworth firm, and others produced smokeless powder.

With this it was possible to accelerate the discharge, and not have the arc of fire hidden by rolling clouds of smoke. One of the great problems of aim was solved.

Smokeless powder completed the rout of the surface torpedo-boat, and set the inventors to work on submarines. The naval quick-firer was rapidly established by Armstrong, Mitchell and the Chantiers de la Méditerrannée.

The military quick-firing gun presented its makers with another desperate obstacle to efficiency, to accuracy of aim and rate of fire. When the gun was fired it "kicked" so violently that much time was lost replacing the carriage in position and re-laying the barrel. Years were occupied by the gunmakers in improving means for absorbing the recoil by exhaust chambers which should, at the same time, not add unduly to the weight of the gun, and in affixing "spades" to the wheels and shaft should hold the carriage in position. It is the last method which has occupied most attention and achieved most success in recent years. Similarly, new difficulties in handling the propellant were discovered and had to be solved before the quick-firing field-gun could reasonably be pronounced a success. Finally, motor transport has been called in to bring up the vast stocks of shells required by an arm that has learned how "to be, at times, greedy and prodigious with its munitions."

In the "eighties," Cail et Cie had erected a new department for gun-manufacture, and could turn out 150 batteries of field artillery a year; Schneider's output was between one and two batteries a day; the Chantiers de la Méditerrannée had a war capacity of 10 field gun batteries a month, and Hotchkiss could make 600 guns of all types a year. The St. Chamond's productive power had also been increased, and one and all they had got ready for making their entry into that world market which had hitherto been almost the exclusive preserve of Friedrich Krupp.

In 1885 the gates were flung open, and French munitions poured out on to the markets of Europe and America. St. Chamond and Cail, Schneider and Hotchkiss were, at this time, working in close conjunction. The effect of this new move in France was to bring about a speedy combination and expansion of the German artillery, explosives, and small arms industries.

In the next year, 1886, the Nobel Dynamite Trust Co. Ltd. was incorporated in London to hold the shares of :—

The Rheinische Dynamitfabrik,
The Dresdner Dynamitfabrik,
The Dynamit A.G.,
The Deutsche Sprengstoffe A.G.,
The Nobel Explosives Co. Ltd.,
The Alliance Explosives Co. Ltd.,
La Société Nobel (Avigliano, Italy), etc., etc.

The first four had really been owned by the Commerz und

Disconto Bank of Hamburg, and the Nobel Explosives Co. Ltd., by the Commercial and Union Banks of Scotland.

Next a French-Italian group of Nobel firms was formed, and an agreement was entered into between the two groups to continue for twenty-five years. This was renewed in 1911.

In 1889, the German subsidiaries of the Nobel Trust concluded another agreement (which was to run till 1950) with the Köln Röttweiller Pulverfabrik, Wolff and Co. and Cramer and Buckholz.

In 1890, Nobels absorbed the Sprengstoffe A.G. Carbonit, and, again, in 1894, linked up with the Rhein-Siegener group in yet another Kartel.

So much for military explosives. Now for the alliance of machine tool makers, rifle manufacturers, and the explosives trades.

In 1887, Isidore Löwe, head of the Löwe firm since the death of his brother Ludwig Löwe, established a rifle factory at Martini Kenfelde near Berlin, for making small arms and ammunition. In 1888, he took over the "Gewehrfabrik von Mauser in Oberndorf," and in 1889, founded, in conjunction with the "Köln Röttweiler Pulverfabrik," the "Deutsche Metallpatronenfabrik zu Karlsruhe" (German Metal Cartridge Factory of Karlsruhe). "This combination of producers of rifles, munitions, and powder caused an immense development of the German small arms industry and secured for it the control of the world market." (*Meyer's Konversations-Lexikon,* 1904.)

Such was the immediate reply made by the German arms trade to the invasion of the market by the French firms intent on emancipating Europe from the clutches of the Krupp-Mauser Kultur. This was the industrial process that was going on during the transition period when, obviously, France and Russia were about to conclude an offensive and defensive alliance, and to join their resources and co-ordinate their efforts. Germany was preparing for a mighty effort to arm on both frontiers and to wrestle with France on the field of military industry. The naval "boom" in Britain was having its equivalent in Germany. The recovery of France and the coming together with her of Russia constituted the adequate reason.

France had increased her army by 44,000 men in 1887, and in 1889 had 63,000 more men on a peace footing than had Germany. In that year France made yet another effort, and in 1891 went into alliance with Russia.

Germany was confronted with a most formidable task of preparing to resist on the West and the East.

In the summer of 1890, a new law was brought forward in Germany, providing for 70 new batteries of field artillery to cost 22,500,000 francs and 50,000,000 francs for military works.

Next year, Austria budgeted 5,000,000 francs for repeating rifles and 6,500,000 francs for smokeless powder, erecting at the same time new works at Pressburg and giving extensive orders to Nobel.

Italy, which had voted 23,500,000 francs for arms and ammunition, and 17,000,000 francs for a new powder factory further from the French frontier than Nobel's Franco-Italian works at Avigliano, near Turin, ordered 4,000,000 francs of new rifles from the Austrian Arms Factory at Steyer in 1891, and spent another 4,000,000 francs on fortress and other guns. Russia was, meanwhile, adopting St. Chamond and Canet artillery.

Krupp was losing somewhat of his influence in Belgium, where Cockrill, of Seraing, was making artillery, but in 1889 the Fabrique Nationale des Armes de Guerre à Liége was formed to work the Mauser patents, and fell under German influence. The Belgian Government then adopted the Mauser as its army rifle.

From 1891 to 1898 was the great and almost silent period of experiment and improvement of field guns, when every great armament firm was endeavouring to produce an ideal quick-firing gun. From 1892 to 1897, Krupps issued no reports on their artillery, and sent no samples to the exhibitions. During this time they were hard at work and employing "the various kinds of powders made by the associated explosive factories of Cologne and Röttweil." In 1896 they brought out a new field gun which, whilst not rapid-firing, was considered by the Germans to be even preferable. Schneider produced a "75mm." field gun in 1893 that was a quick-firing piece, but their masterpiece, the famous gun, was the model of 1896, subsequent improvements being in the anti-recoil mechanism of spades for wheels and trailer.

In Russia, likewise, from 1894 to 1899, General Engelhardt was experimenting with a new type field gun at the Poutilov and Alexandrovsk Factories, evolving one finally with a reputed fire of 16 shots per minute. In 1898, the Maxim-Nordenfeldt departments at Erith, of Vickers, Sons and Maxim Ltd., produced a quick-firing 3in. weapon, which was adopted next year by the War Office, who ordered 200 guns—90 from Woolwich, 60 from Vickers, and 50 from Armstrong Whitworth.

The closing years of the old century were marked by prodigious expenditure on field-gun equipment by all the great and most of the minor Powers. In every country producing guns a more or less satisfactory quick-firer had been manufactured. In Germany, Ehrhardt and Krupp; in France, Schneider (now amalgamated with the Chantiers de la Méditerrannée), St. Chamond and Chatillon-Commentry; in Austria, Skoda; in Britain, Vickers; in America, Bethlehem had all evolved guns to suit their patrons.

Melinite, cordite, lyddite had all added to the destructive power

of artillery fire, and the smokeless rifle powders had given a new impetus to machine gun and magazine rifle production.

In 1891 Mannlicher, of the Oesterreichische Waffenfabrik, of Steyer, patented the magazine rifle, which has become the standard of the Austro-Hungarian Army, and most of which have been made at this works, now linked up with the Deutsche Munitions und Waffenfabrik, whose director, Dr. Paul von Gontard, seems to be ubiquitous in the small arms and machine trades of Central Europe. Paul von Gontard and Admiral Hans Sack, of Krupp, the Köln Röttweiler Pulverfabrik, and the Deutsche Waffenfabrik had their finger in every pie. They were the true successors of the Löwe family.

They have been the heirs of this most resourceful and ever-present capitalist dynasty, whose operations were more far-reaching and insidious than those of the loudly advertised and execrated Krupp.

Ludwig, Isidor, and Sigismund were everywhere and in everything.

Ludwig was the the founder of the house; Isidor consolidated its power and Sigismund was its ambassador.

Mr. Sigismund Löwe early joined the directorate of the Maxim-Nordenfeldt Gun and Ammunition Co. Ltd., of London, and passed on to the board of Vickers, Sons, and Maxim Ltd., when the smaller firm was absorbed. He was with this most British of British firms until his death in 1903. He was one of their representatives on the board of the Steel Manufacturers Nickel Syndicate Ltd., and was a shareholder in the Chilworth Gunpowder Co. Ltd. from 1901 to the time of his death.

Vickers afterwards maintained the Löwe tradition by continuing to act as the London agents of Paul von Gontard's concern, the Deutsche Waffenfabrik.

The importance of the Löwe brothers was quite equivalent to that of Krupp, the Nobel group, and the Duttenhofers, and how great was this may be judged from the following remark of General von Falkenhausen, Prussian Minister of War, in the Reichstag in February, 1896:—

> "In all that concerns explosives, the Military Board is wholly dependent on the private industry. The concurrence of this is, moreover, in every way, indispensable in the event of war."

Behind the German Navy Law

It is almost inconceivable to-day to recall that within the memory of men still living Prussian warships were built on the Thames-side to the designs of the British Admiralty's Chief Constructor.

But when Prussia again began to build a Navy subsequent to the blockade of the harbours of the German Bund by the Danish Fleet in 1848, she had, perforce, to have the ships built in Britain, France, and the United States. She had only one dockyard, the Klawittes, at Dantzig, and it was not capable of turning out anything much bigger than a gunboat.

The paddle-frigate "Dantzig" built at Millwall in 1851 by Messrs. Robinson and Russell, was one of the first ships in the Prussian Navy, and another frigate, the "Thetis," was exchanged by the British Government for two gunboats built at the same time and in the same yard.

In 1860 Prussia decided to have ten armour-clads, and at least three of these were engined by the Chantiers de la Méditerrannée. In 1869 she took over the frigate "Fatih," building at Millwall for Turkey, and renamed her the "König Wilhelm I."

After the Franco-German War the Imperial Government began building operations and Fleet provision on a more ambitious scale. In 1868 an armoured ship, the "Hansa," had been laid down at Dantzig, and, in 1873, the "Preussen" was commenced at the "Vulkan" Yard. In the same year the "Deutschland" and the "Kaiser" were put in hand by Samuda Bros., of Poplar. These were the last armour-clads built abroad, the Government determining for the future that all vessels and materials should, so far as possible, be of German construction. Two more armour-clads were launched before the end of 1878, but after that there was an almost complete stoppage of naval construction except small craft. All armour-plate during this early period was of Brown and Cammell manufacture.

In 1866 the Germans commenced to lay out the great Dockyard at Wilhelmshaven, near Bremerhaven, and, soon afterwards, the Kiel Dockyard. The first ship was launched from the latter in 1874.

In the Middle Ages the great cities of the Baltic, the Netherlands and Frisiah Coast had been the possessors of the stately merchant navies of the Hanseatic League and had been justly famed for their splendid seamanship and naval craft. But those days had long gone by, and the glory of the Hansa was no more. Modern German shipping began with the foundation of the Hamburg-Amerika Line in 1847 and the Norddeutscher Lloyd ten years later. Most of their early ships were built at Greenock by Messrs. Caird. Later on, the Norddeutscher Lloyd laid out a yard at Kiel, which was taken over in 1879 by Herr F. A. Egells, who united his Berlin machine factory and the Kiel Shipyard as the Schiff- und Maschinenbau A.G. "Germania."

Another yard, that of the "Vulkan," who have in recent years so frequently raced John Brown and Co., Ltd., and the Fairfield Company for the blue riband of marine engine output, was established in 1851 by Fruchtenicht and Brock at Bredow, near Stettin, and was taken over by eight Stettin and Berlin financiers in 1857. They built their first warships in 1866. Their engineering manager was trained in Italy and their shipyard director at Barrow-in-Furness. At a later period they were to become associated with the Mannesman Tube Company and the Hamburg-Amerika Line.

At Kiel there was also the Howaldtwerke, a private firm dating from 1876. Besides the Weser Company, of Bremen, and Blöhm und Voss, of Hamburg, there was the Schichau Company of Elbing and Danzig, who had been engineers since 1837 and shipbuilders since the "fifties." This firm had by far the oldest connection with the Prussian Government. About 1884 it took preference over all others for torpedo-boat construction, and built some 70 boats in two years. Schichau was among the chief rivals of Yarrow and Thornycroft, and has always maintained his reputation for exceedingly swift steaming craft. This firm had plenty of foreign orders in the late "eighties" and early "nineties," doing much work for Russia and Italy.

The Stettin "Vulkan" used to do work for China, Scandinavia, and a few other minor navies, but neither for mercantile nor naval demand could the German firms seriously compete with their long-established British and French rivals.

We must now turn to the United States and note how, there, the Government was giving direct State subvention to a weak and struggling shipbuilding industry by the renovation of the American Navy. The more than ample Fleet which the Civil War had dowered the United States with—an armour-clad fleet—had been rendered obsolete by the adoption of the Armstrong type of cruiser and the developments of gun and armour in the early "eighties." The decisive victory of Chili over Peru and the construction of the wonder-cruiser "Esmeralda" for the former, startled certain

Americans into alarm for the naval future of the Pacific Ocean. The rapid growth of the Oriental navies and the shipbuilding activities of Spain all gave a political impulse to American navalism. According to the *Scientific American,* the shipbuilding industry in the United States had become "utterly stagnant" and required "some powerful stimulant to arouse it." In 1883 Congress authorised three protected cruisers, and followed these up with a thorough-going naval programme. The United States Navy Board called in the Bethlehem Iron Works and the Carnegie, Phipps Co. to supply armour-plate and guns. The steel magnates of America have ever since, more and more steadily, pressed forward the demands and requirements of armour-plate patriotism.

The Union Ironworks of 'Frisco; Wm. Cramp and Sons of Philadelphia; the Newport News Shipbuilding Company, and other yards by 1896 were

> "qualified to undertake the construction of the largest mercantile steamers and . . . to rival the best work of the European builders."

They were building warships for Russia and Japan, and they were thrusting themselves forward into the world shipbuilding market.

The French shipbuilders were ousting the Germans, and the Italian builders were prospering steadily by their own Government's naval ambitions. Just when the German firms were beginning to see hope gleaming ahead, and when Bismarck had provided a bounty for German ships built in Germany of German material, American, French, and Italian firms strode forward, invigorated by the support of their own Governments and assured of renown and profit from the construction of American, French, and Italian Navies.

The moral was obvious: Germany must have a Navy.

Meanwhile, Germany's over-sea trade was growing by leaps and bounds. From 1880 to 1899 German exports grew in volume nearly 100 per cent., and her imports enormously increased. Her merchant fleets were becoming larger and her vigorous industrialism required more outlets. Phenomenal was the development of her iron, steel, and engineering trades. "The will to economic power" was everywhere evident. Her economists and historians meanwhile taught the importance of being well and thoroughly organised for war as well as peace. Tariffs, bureaucratic collectivism, and industrial and financial organisation under high imperial patronage became the order of the day. The teachings of Admiral Mahan, the American naval historian, had a profound influence on the impulsive young Kaiser, for whom, on one occasion, a British naval review had been specially organised, whereat the new-created Admiral of the Fleet led his Grandmother's Navy out to sea. Old sailors at Cowes and Portsmouth would tell

fine stories of the young gentleman's enthusiasm, half for Grandmother and half for Grandmother's splendid ships.

To Mahan's philosophy were added Beresford's perpetual vapourings and Armstrong's solemn warnings of the peril of the cruiser to merchant shipping. But Germany had a great merchant marine going daily by the shores of England and France, down a potential avenue of hostile fleets, from the Narrow Seas to the Ocean.

If Britain needed to defend her merchant shipping from French commerce destroyers, why, so did Germany—even more so. Whilst there were plenty of her plaguey professors to echo Cramb and Spenser Wilkinson and our fire-eaters and to tell the tale of how English sea-power had ruined the Hansa and the Dutch, how it had preyed on the Spanish galleons and French marine, and how England still was England, a nest of pirates and buccaneers.

The German Navy League came into being soon after our own, and the agitation for a Navy went on more fervently.

It will be remembered how the French firms entered the world market for military material in 1885, and thus struck a heavy blow at the dominion of Krupp in that field. Soon afterwards occurred the great "pool" of armament and explosives industries to which we referred in an earlier chapter, and in 1891 Krupp absorbed the Gruson Works at Magdeburg, so adding gun-mounting and armour shops to his Essen enterprise. In the same year Krupp completed an armour-plate plant at his original works costing £600,000. He had concluded a monopolist agreement with the Dillingen Steel Company, of Westphalia, who had been making armour since 1876. Subsequently, Krupp installed a Harveyising plant, and then, in 1896, brought to perfection the Krupp process of Herr Emil Ehrensberger. All this entailed enormous expense and brought little or no return, since the Reichstag refused money for a Fleet, and foreign nations would not order armour from an inexperienced manufacturer.

In 1896 Krupp leased the "Germania" Yard at Kiel, and thus consummated an old ambition of his to control this famous yard. Krupp had entered the naval industry, partly to spite the French firms, partly to add a new department of a potentially profitable nature, and partly to further the ambitions of his very influential shareholder, the Kaiser.

In 1888 the young Kaiser had emancipated the Navy from military control, and set up an independent Admiralty. In 1890 four sea-going (as opposed to coast-defence) battleships were laid down and there seemed prospects of further increases. Then the alliance of France and Russia required great military outlay, and the Reichstag would have none of the Navy Bills. Meanwhile, the Kaiser Wilhelm Canal was being pushed forward, and was ready in 1896. This was an essential preliminary. In 1895 the

ridiculous Kruger telegram had aroused a wave of indignation in Britain, and the British Government had been almost equally foolish in instantly mobilising a special cruiser squadron against a Power that could, obviously, give no effect to its words. The Kaiser was becoming more and more anxious for a Fleet, and in 1896 Krupp laid down two cruisers, for which no monetary provision was for a while forthcoming.

Then, in 1898, the enthusiasm of the China Expedition sent out to avenge two martyred missionaries of the Prince of Peace gave the opportunity to Tirpitz to bring in and pass his first Bill for seven battleships, nine cruisers, and other ships, in seven years, at a cost of £21,000,000.

Two years later, the seizure of the "Bundesrat" by the British Navy—an act for which our Government apologised—provided the psychological moment for the introduction and passing of the second Navy Law of 1900. Strenuously fought by the Radicals and the Socialists—Bebel warning the Government that it would be taken in Britain as a challenge and would lead to war—it was pushed through.

By its original terms it provided for two battleships and one armoured cruiser per year for seventeen years and torpedo craft and light cruisers in proportion. It just ensured one armoured ship every two or two and a half years to each of the six private firms. It gave them the "necessary assurances for future work," of which Count Reventlow has so much to say in his writings. It came as a boon and a blessing to Krupp and Dillingen. It was a delight to the Nobel International from Berlin to Glasgow and back again.

It removed the development of the Fleet from the uncertain interference of the Reichstag—this von Reventlow unblushingly records. It promised that Germany should "be able to speak plain German through her Navy." It was made unduly provocative. Like the German militarist mind always does when it thinks people are listening, and the non-German militarist mind does when it thinks people are *not* listening, it spoke its naked philosophy.

Germany shook her fist in the face of Europe in general, and Britain in particular, with the evident aim of committing an unwilling Reichstag to a course from which the logic of events should make it impossible to withdraw—and all to the glorification of Kaiserism and the endowment of Krupp!

Ten Years of Changing Policies

In 1898, two struggles of the later Nineteenth Century came to an end. The tariff war between France and Italy terminated, and with it the relations of the two Mediterranean Powers began perceptibly to change. The Italians almost ceased their naval preparations, and disposed of several of their new cruisers to Spain and Argentina. The first great naval armament boom in Italy was drawing to a close, and for the next ten years Italy desisted almost entirely from Fleet construction.

The victory of Sir Frederick Kitchener at Omdurman and the pacification of the Soudan brought about a temporary crisis at Fashoda, but this quickly passed over and the Egyptian question was virtually closed when Marchand withdrew.

From 1899 to 1906 the French almost ceased the construction of warships and severely retrenched with serious consequences for the private shipbuilders and armour manufacturers.

Meanwhile, the battles of Manila and Santiago de Cuba had ended the last naval pretensions and colonial ventures of Spain. The United States faced the European Powers as mistress of the Americas. The satisfactory conclusion of the Venezuelan dispute between the United States and Britain and Lord Salisbury's diplomatic support to the Republic at the outbreak of the Spanish War had made it plain to Germany that she had nothing to hope for in South or Central America and that the Western Continent was to remain under Anglo-Saxon influence.

As a result of the agreement with Britain in 1904, France was relieved of the necessity of great naval preparations to safeguard her shores and those of her Colonies against the new German Navy, and was enabled to concentrate her energies upon military measures.

From 1878 to 1895 the pressure of Russian antagonism had been most keenly directed against the North-West frontier of India, but about the latter year some understanding was arrived at and the storm centre shifted to Manchuria. There the consequences of the unsatisfactory conclusion of the Chino-Japanese War had prepared the way for another and more terrible struggle.

Germany, probably not without a sinister motive, had supported Russia against Japan. Britain, on the other hand, had put her diplomatic assistance at the service of Japan, and continued year by year to give the Eastern Empire increasing encouragement. It was generally expected in the years preceding the Russo-Japanese War that this country would give armed support to her protegé in the event of war with Russia.

All Japan's warships, with a few minor exceptions, were built in this country on British models, and her seamen were trained by British experts, and her engineers instructed here in public and private workshops.

When Russia, in the autumn of 1898, embarked on a great programme of battleship and cruiser construction, the vessels to be ready in 1903 and destined for the Far East, the British Government brought in huge Supplementary Estimates, which were expressly stated to be intended as a reply to Russia's preparations. Our Admiralty laid down ship for ship against Russia, and designed the vessels (amongst them were the "Cressy," "Hogue," and "Aboukir") to pass through the Suez Canal.

At this same time in South America the relations of Chili and Argentina had become much more strained, and there are signs that this rivalry was not unwelcome to Signor Perrone of George Ansaldo and Co., of Genoa, and Armstrong and Vickers in this country.

Something had to be done to improve the armament trade in Italy after the agreement with France, and Signor Perrone, by an enterprising display of Garibaldian chivalry in raising a corps of volunteers for Argentina, secured the favour of the Buenos Ayres authorities and great orders for cruisers for Ansaldo and Co.—then in fierce rivalry with Armstrong. No sooner did Ansaldo commence the "Moreno" and the "Rivadavia" than Sir E. J. Reed, who was visiting South American waters "for his health," found that Chili wanted two light battleships, which he designed and got placed with Vickers and Armstrong Whitworth.

In 1902-3, Chili and Argentina came to terms of amity. Argentina sold the two Ansaldo cruisers to Japan on the eve of the war, and Chili had the two battleships purchased by Britain to avoid them going to Russia! One of them, the "Triumph," was recently sunk trying to blast a path for munitions for Russia!

The Russo-Japanese War came, and the Russian Fleet, to the fame of Vickers and Armstrong Whitworth, was shattered and destroyed by their ships and their guns. Russia was beaten, came to terms with Japan, and since then options on the outworks of China have been amicably shared out. Thibet to Britain, Mongolia to Russia, Manchuria to Japan.

Russia now became more kindly disposed to Britain. She wanted money, and so she came to London for gold. She ordered new cruisers from France and from Vickers. In 1907, Britain and Russia agreed to protect Persia, and so drew a sharp line across Germany's path towards the Persian Gulf. The next year, 1908, witnessed the annexation of Bosnia and Herzegovina by Austria-Hungary, a step which, whilst not over-pleasing to Germany, as the unofficial ally of Turkey, definitely split off the Italian Government from any hearty co-operation with the Central European Powers. Italy, which had already proved friendly to Britain, France, and Spain at Algeciras in 1906, now found herself with diametrically opposite interests to her allies on the Balkan coasts and hinterland of the Adriatic. She would have to choose for the future whether she would have Britain or Germany for a friend in her plans for imperial expansion—and Germany's first love was her hated Austrian rival.

Sir Philip Watts and his Dreadnoughts

To-day, when we are hearing so much about the foresight and the capacity of Lord Fisher, and are being told of his responsibility for the adoption of the "Dreadnought" types of battleship and cruiser, the writer has often felt that justice has not been done nor sufficient acknowledgment made to the great work of the late Director of Naval Construction at the Admiralty, Sir Philip Watts.

Perhaps some future Samuel Smiles, writing a new series of those invaluable "Lives of the Engineers" will give him a place alongside of Smeaton, Watt, Neilson, Napier, and Stephenson.

This chapter cannot pretend to do more than estimate the value of the contribution made by this great naval architect to the art of modern shipbuilding and to the growth of the world's Fleets. It does not aim at giving a biographical sketch but rather at an appreciation of one whom the writer holds to be the most brilliant of all the remarkable men who have made the technical efficiency of Armstrong Whitworth and Co., Ltd., the marvel of the world.

Philip Watts was, originally, a draughtsman at the Admiralty before he proceeded in the early "'eighties" to the staff of the Elswick shipyard. There he was an understudy to Sir William White, succeeding the latter as Armstrong's chief designer when Sir William returned to the Admiralty in 1885.

He was the designer and directed the construction of the greater part of that excellent battle fleet which Togo used with such deadly effect in the Russo-Japanese War. It was, in great measure, his ships which focussed the attention of the naval world on the cruiser after the battle of the Yalu River between Japan and China in 1895. He was as much the father of the big gun cruiser as Pett was of the ubiquitous frigate of an earlier age. It was he who improved the protected cruiser, and pioneered the way of the excessive speed and gun-power of ships so long neglected by our Admiralty but which gave us the victory at the Falkland Islands and on the Dogger Bank.

For a whole decade, or longer, the Admiralty turned a deaf ear

to the teachings and suggestions of the Elswick firm. It refused to have its ships built there or to adopt as its standard ship the heavily-armed cruiser which was the Armstrong idea of a perfect war-vessel. It turned aside after new firms, or, at least, placed its reliance, so far as possible, in others than Armstrong Mitchell and Co.

From 1888 to 1896 the favours of the Admiralty were particularly for Vickers Sons and Co. Ltd., of Sheffield. To this old-established steel-producing firm the Admiralty went to emancipate itself from the bondage of Elswick, so far as gun-supplies were concerned, and from that of Brown and Cammell in respect of armour-plates.

In the latter year came about the amalgamation of Vickers Sons and Co. Ltd., gun and armour manufacturers of Sheffield, with the Naval Construction Co., of Barrow-in-Furness, and the Maxim-Nordenfelt Co., of Erith, Birmingham, etc. Vickers Sons and Maxim Ltd., as they now styled themselves, began to lay out the Barrow yard on a gigantic scale, to erect marine-engine shops, gun-mounting sheds, shell factories, and to extend the building berths. They spent more than £2,000,000 in five years on improvements.

They took Lieutenant Trevor Dawson from Woolwich Arsenal to be their gunnery expert and Mr. Dunn from the Admiralty to superintend their shipyard. Their preparations were most lavish and thorough-going as those of Vickers always are. They were obviously challenging Armstrong, Mitchell and Co. Ltd., in their most important asset.

The entry of Vickers into this new field of activity enormously stimulated the Armstrong firm, and the burden of this new effort fell upon Philip Watts. His heavy gun cruisers and his remarkably efficient battleships had engaged the patronage of Japan, Chili, Brazil, and other Powers; they had proved themselves in battle; their type was generally accepted everywhere. Vickers produced, thanks to Lieutenant Dawson's genius, some exceptionally fine gun types, and the combination of armour-manufacture and gun-construction by that firm caused Armstrong Whitworth and Co. Ltd., greatly to extend their works, to change from their more conservative methods and to devote vast sums to improvement and research.

Not only did Vickers confront them, but John Brown and Co. Ltd., had absorbed the Clydebank Shipbuilding and Engineering Co., Ltd., in 1898, and had thrown down the gauntlet to both firms by taking up the construction of armoured ships in the most important yard on the Clyde. J. and G. Thomson's had all along been a cruiser-constructing firm. From the "Terrible" to the "Tiger" that yard has been exemplary for the power of its greyhound ships.

With the financial and economic resources of John Brown and Co. Ltd., at its disposal, it seemed quite likely that Clydebank would trench on the foreign cruiser markets of Armstrong Whitworth and Co., Ltd. About this time, Armstrong's ingratiated themselves with the Admiralty—probably by putting down new armour-producing plant and so making the authorities less dependent on Vickers, Brown, Cammell, and Beardmore. Then Armstrong, Whitworth, and Vickers Sons and Maxim began to display a curious though indefinable solidarity. It was an "entente" with commitments undisclosed rather than an alliance avowed. It is hard to decide whether the Admiralty did or did not approve the new "marriage of convenience"—it was nothing else.

Then, in 1901, the Admiralty secured the services of Mr. Philip Watts as Chief Constructor, and he left Elswick for the scarcely less important position in Whitehall. He was the second of the three successive Chief Constructors whom the Admiralty have taken from Elswick, whither they had, at first, gone after a preliminary Admiralty training.

The coming of Mr. Watts brought a new, scientific, up-to-date *regime* into the Constructional Department at Whitehall. There had been little change since the middle "eighties," and Sir William White was never an Armstrong man in the sense that Mr. Watts had become in nearly twenty years at Elswick.

The new ideas, the wide practical experience of successful ships of battle proof, the freedom from the harrassing considerations of expense which dominated men in the old Admiralty, all made for new vigour.

Germany was entering the naval lists; Russia was at the height of her maritime eminence; the lessons of 1898 were setting the United States on new paths of ambition. There was to be no end of naval rivalry, though France was falling out.

In the naval combats of the future it was plain that it would be a case of "The Race is to the Swift and the Battle to the Strong."

Mr. Philip Watts' first act was markedly to increase the gun power of the "County" class of cruisers then building. They became more characteristically "Watt" than "White" in armament.

When Sir John Fisher became First Lord of the Admiralty there was a clean sweep of the "barnacle" brigade. "Efficiency" became the one purpose. Monetary considerations were no longer to be permitted to check naval "preparedness" any more than professional traditions.

Fisher gave Watts his heart's desire.

Fisher—blunt, grand old war sea-man, with no ideas of "civilising war" any more than "civilising hell"; no visions of putting Tirpitz' feet "in hot water"; but a cold, steely, deter-

mined warrior, without any cant about him—he believed that Germany was bent on challenging our Sea Power, and he determined to smash Germany. One suspects that this Fisher makes the marrow of many of our countrymen run cold with his deliberate war philosophy. Fortunately for them, Fisher does not talk too much, and so our mealy-mouthed Jingoes do not need to apologise for or explain him.

Fisher saw that German naval strategy hinged on the Kaiser Wilhelm Canal, and that our adoption of big battleships would constantly lay our rival under the obligation of widening and deepening that Canal at colossal expense. Fisher, therefore, determined to render the entire German Fleet obsolete so soon as possible, and gave Watts a free hand to design and produce the "Dreadnought."

Intermediate between the "White" battleships of the "pre-Dreadnought" type and the "Dreadnought" were the "Lord Nelson" battleships, wherein Watts placed six more 9.2in. guns —weighing about 25 tons each—than the "King Edward VII." ships carried.

The increase in cost of armament was enormous owing to the need for larger and more numerous heavy gun-mountings.

In the "Dreadnought," Watts placed five pairs of 12in. guns instead of two pairs. Each of the five turrets carried two 56 ton guns, was plated with about 150 tons of armour costing from £108 to £175 per ton, and the total cost of each mounting was somewhere in the region of £100,000. For the supply of these, Vickers and Armstrongs had an absolute monopoly.

That was not all. The increased gun-power made the strain on the ship greater and required more gigantic ship-structure, *i.e.*, more steel. The increased speed, which was a main feature of the "Dreadnought," needed huge engines, larger coal bunkers, and, of course, a longer hull. This, in turn, necessitated more armour—a total of about 4800—5000 tons of plates at £108—£120 per ton.

Watts' dream-ship was a monster with terrific gun-power, with tremendous speed and enormous armour-protection. She combined the Armstrong, Cammell, and Parsons' cult—guns, armour, and turbine engines.

The "Dreadnought" was the logical consequence of giving an Elswick genius as much money as he cared to spend, and if you will have a big Navy of big ships to make you a big Empire, pay your tribute of admiration to the Father of the "Dreadnought"—Sir Philip Watts, now retired and lately returned to the directorate of Armstrong Whitworth and Co. Ltd.

British and German Dreadnoughts

In the year 1904 took place Fisher's "Great Scrap," when he, ruthlessly, swept off the Active List more than a hundred ships of doubtful value, including a great many cruisers of comparatively recent date. These were mainly vessels of the type which had been popularised by Armstrong, vessels which had sacrificed everything to a plenitude of mediocre guns and to high speed. They were ships which had poured money into the coffers of the Naval Construction and Armaments Co., the Fairfield Shipbuilding Co., J. and G. Thomson's, Palmer's Shipbuilding Co., and the marine engine makers and gun manufacturers. They were monuments to the discarded naval teaching of Lord Charles Beresford, the most conspicuous of the "barnacle" brigade. It appears, on the face of it, to have been a drastic and spendthrift proceeding. It was not Fisher, however, was the rake, but those who had unloaded on the nation this lumber of useless metal. These ships were really a gigantic subsidy to the cruiser-building firms and the marine engineers, a monstrous product of ill-considered unemployment relief schemes.

They had found work, they had supplied dividends and the prestige that goes with naval contracts, but they were useless as warships, and their upkeep was only a further extravagance. It speaks well for Fisher that he had the courage to "scrap" them.

Then the Fleet was redistributed—or, rather, it was concentrated in home waters—and the old far-distant squadrons were broken up. The China Seas and the Mediterranean were considered of less importance than the North Sea. Again Fisher acted with discretion and courage. He knew what he wanted, and he set out to get it. The writer does not agree with the tendencies of British policy at this time, nor does he profess any great admiration for Fisher's views on the politics and economics of sea power, but that does not prevent him feeling nor deter him from expressing his sincere regard for Fisher's genius as a naval expert.

He believes that opponents of large armaments make a

profound mistake in not entering more sympathetically into this question, and seeking to appreciate the spirit that animates the great British Navy. It is a wonderful organisation. It has been directed by men of the purest and most disinterested motives. It is staffed by officers imbued alike with regard for its long and splendid traditions, and intense determination to keep it up to the highest standard of efficiency.

So long as he lives he will remember the thrill of admiration and something akin to pride that he experienced when he viewed the Grand Fleet at Spithead, in July, 1914. It was a mighty monument to the science and craftsmanship of Britain. It was a Tragedy of Steel cunningly designed and admirably welded to the fulfilment of the misdirected genius of a nation.

In 1905 Europe was thrown into commotion by the dramatic appearance and speech of the Kaiser at Tangier in the early Spring, and for a whole year the negotiations that led up to Algeciras continued their acrimonious course. Germany was then about to lay down the fifth quota of two battleships and one armoured cruiser, as prescribed in her Navy Law of 1900. Two months after the speech at Tangier the British Admiralty Select Committee on Naval Design presented its report. Now, it is unquestionable that the "Dreadnought" was actually projected before this, and that the Committee merely ratified the plans and made sundry suggestions. Amongst other questions considered were the economical reorganisation of public and private shipyards, with a view to the construction of heavier warships. This Committee had its corollary in the Murray Commission, appointed in the same year, to consider, among other things, how far State manufacture of war material could economically be replaced by that of "the trade."

The "Dreadnought" was *officially* laid down in October, 1905, and launched in the following February, but Armstrong's were engaged on her gun mountings long before the ship was officially commenced. She was finished by the following autumn. She was built in a loudly-advertised secrecy, and the Powers paused their 1906 programmes till they saw what Britain had in hand at Portsmouth. When she steamed out she startled the world—far more than she need have done, for she was not so remarkably revolutionary.

Instead of having two big mountings and a pair of guns fore and aft, she swung ten 12-inch muzzles in five barbettes. She could steam two knots faster than her predecessors, and she was the ugliest squat monstrosity that had yet disfigured the blue ocean.

The Germans discontinued their battleship construction, and 1906 slipped by and only the heavy armoured cruiser "Blücher" was put in hand.

Crafty old man Fisher had stolen a long march on Tirpitz. Tirpitz, like everybody else, had his eye glued on the "Dreadnought." He believed that the new cruisers were only to be 15,000 tons, and that they would not mount the heaviest guns. So he placed twelve 8.2-inch guns on the "Blücher," and laughed a gleeful laugh. All the time, however, Elswick, Fairfield, and Clydebank were busily at work on the "Invincible," "Indomitable" and "Inflexible." Each of these was a cruiser for speed and armour protection, but a battleship with eight 12-inch guns. Each of them could swing as many 12-inch guns on a broadside as the "Blücher " could 8-inch guns. Tirpitz had been "diddled."

In 1907 Britain had four Dreadnoughts ready for business. Germany had none ready for launching.

Before going out of office Lord Cawdor provided for four armoured ships, *i.e.*, four battleships or battleship-cruisers, to be laid down every year. Presumably, two in the dockyards and two by private contract. It seems probable that the guns and mountings of three ships were to be provided by Vickers and Armstrong, those of the fourth by the Coventry Ordnance Works, so soon as the Scotstoun shops were completed.

Hereby hangs a tale—or, rather, a number of tales. Those tales were fraught with the very gravest possible consequence for the future peace of Europe.

The writer has told one tale in "How Asquith Helped the Armour Ring." Partly told it, for since writing that pamphlet he has found what he believes to be the master-key to this great Capitalist mystery.

When the Liberals came to power in 1906 Lord Tweedmouth reduced the Cawdor programme for the year from four ships to three, and maintained that number in 1907. The reason for this was, avowedly—and, the writer believes, honestly—so far as the Cabinet as a whole was concerned, and, certainly, Campbell-Bannerman, to extend to Germany a reasonable offer of a reduction of naval armaments. The Hague Convention came in 1907, and Germany rejected that offer.

In 1905 the British had put down four Dreadnought ships; in 1906 three Dreadnoughts; and in 1907 again three Dreadnoughts. That is to say, the British Admiralty programme was diminished by two ships, and in 1908 the provision was for only two Dreadnoughts.

In Germany, on the other hand, the two battleships and one cruiser of the 1905 programme were followed by one large cruiser in 1906, and the two battleships of that year were held over until 1907, when five Dreadnoughts were commenced. In 1908 four Dreadnoughts were provided for, and it was this complicated manœuvre on the part of Germany that gave rise to the disputes of the " We Want Eight " agitation.

Carefully analysed, the position of affairs can easily be clarified, but it was not the desire or in the interest of our various naval alarmists to clear the issue.

The Germans waited in 1906 to see what sort of a ship this "Dreadnought" was going to be. Then they found that they must increase their battleships from 13,000 to 18,000 tons or fall out of the race. They had. therefore, to overhaul all their building berths, their shipyard accommodation, and their engine shops. This took them until the summer of 1907. By that time they had discovered the new cruiser type which the British had evolved, and they, naturally, followed suit, building a Dreadnought cruiser instead of a cruiser of the type Britain had abandoned.

So in 1907 they had to put in hand two Dreadnought battleships of 1906, two Dreadnought battleships of 1907, and one Dreadnought cruiser of the same year—five Dreadnoughts in all.

All that they had done, so far, was to augment the tonnage and power of their ships to make them a match for the British. This was done by a Navy Law Amendment Act in 1906, which also provided for several fast light cruisers struck out of the 1900 Law by the Reichstag.

Then Von Tirpitz decided that the change in ship design brought about by the "Dreadnought" had reduced the life of a battleship from 25 to 20 years, and this, automatically, reduced the anticipated strength of the German Navy for 1917 by four battleships. In this decision he was only facing facts, but in facing them and meeting them he had to amend his Navy Law again in an upward direction. The new Amendment Act of 1908 provided for one extra armoured ship in each of the years 1908, 1909, 1910, 1911. In 1908, then, the Germans put down four ships instead of three, and the hullaballoo in this country became loud and furious.

Here had we reduced our programme by two ships in two years before The Hague Convention, and Germany had flouted us.

That was how it seemed to the British nation.

But in the year 1906 Vickers and Armstrong-Whitworth obtained orders for two great Dreadnought battleships to be put in hand at once for Brazil. A third battleship was also projected.

The contract between these two firms and Brazil provided for the customary right of the British Admiralty to pre-empt those two ships when they thought fit.

Thus it came about that whilst Britain only had three Dreadnoughts laid down in 1907 *officially,* there were two more Dreadnoughts about to be commenced in British yards, both of which might find their way into the British Navy if emergency required them. These two battleships were also laid down in the summer of 1907, contemporaneously with the first German Dreadnoughts, and were of a type much more powerful than any vessels then building for the British Admiralty. They were experimental in

many respects, and carried twelve 12-inch instead of ten 12-inch guns, as did British battleships then in course of construction.

The Germans were suspicious when they saw the Cawdor programme reduced officially by two ships in two years, and the potential British strength, at the same time, reinforced by two improved Dreadnoughts. Moreover, there were persistent rumours that the third Brazilian Dreadnought had been put in hand—*vide Naval Annual,* 1908.

Also, the French had, in 1906, renewed their construction and provided for six battleships as powerful as the "Lord Nelson," and not one whit less formidable than Germany's own so-called Dreadnoughts. Russia was also discussing plans for a new Navy. Germany's Allies, Italy and Austria, had, meanwhile, no Dreadnoughts in hand. The action of the British Admiralty in letting fake statements concerning the new Dreadnought cruisers obtain currency, the accelerated construction of the first "Dreadnought," and the coincidence of the commencement of the two Brazilian battleships with that of the German ships, all created a bad impression in Germany. Likewise the two amendments of the German Navy Law coming so close together in 1906 and 1908—and at a time when the British Government was offering a reduction of naval armaments at The Hague had a similar bad effect in this country. It provided the necessary atmosphere of mutual suspicion, so necessary to the propaganda of hate in both countries.

The Battle of Beardmore and Brown

SOMETHING HAS already been said concerning the intense rivalry which for several years existed between Armstrong Whitworth and Vickers, Sons and Maxim, and of how, towards the close of the century, the two firms came to the conclusion that competition scarcely paid them. Then there commenced, in deadly earnest, the second great struggle in the naval armament industry, a battle of the Titans, which came to its dramatic climax in the year 1909.

Just as there was a grimly-contested scientific warfare between the gun inventor, assisted by the explosives manufacturer, and the metallurgist constantly perfecting his armour plate, so there had come to be the keenest rivalry between Armstrong Whitworth and Vickers, Sons and Maxim, both specialists in ordnance, and John Brown and Charles Cammell, who made armour, but not guns. Vickers, less obstinate than the Tynesiders, had always produced both the guns and the plate, and, hence, had been favoured by fortune and Admiralty custom during the years when the armour-clads of our Navy sacrificed gun-power to protection. Armstrong, the obdurate, had been saved by the monopoly of gun-mounting manufacture and the extensive custom of foreign Powers requiring cheap battleships in the guise of heavily-armed cruisers.

The "nineties" were, in this country, years when the authorities put their reliance in armour, and gave protection to their ships rather than weight and number of guns. They were years of prosperity for John Brown and Charles Cammell. But this phase could not last. A battleship is a gun-platform, exists to carry guns, to destroy, and, of course, it must be able to catch its enemy. A great weight of armour prevents the mounting of guns and prohibits high speed. Then that battleship, like the slow-footed shell-back, is doomed as a species.

The gunmakers steadily overhauled the armour manufacturers, but because of their own success, they had to devise a great complex of machinery to operate their weapons and give them a barbette and an enclosed hood, a complete shield, to protect both

gunners and mechanism. Vickers undertook the construction of gun-mountings, and Armstrong Whitworth put down armour-making plant.

They invaded the sphere of John Brown and Charles Cammell, and Vickers trenched on the markets of the cruiser-builders of the Clyde. Both of them were constantly perfecting new guns and mountings and producing finer variations of armour.

Partly, in order to vie with these two concerns, and, partly, to avail themselves of the demand for *armoured* cruisers, John Brown and Co. had bought the Clydebank Shipyard in the autumn of 1898. In 1901, William Beardmore and Co., of Parkhead, bought over Napier's old yard at Govan, and so became ship-builders also as well as armour producers.

The battle of the Clyde was beginning.

In the next year, Vickers, who saw the great outlay of the new owners of Clydebank, entered into alliance with William Beard-more and Co. Ltd., took over half the share capital; gave them the support of their own long credit, and enabled them to purchase and lay out a new yard down the river.

Now, the action of the Vickers-Beardmore combination was very smart indeed, as anyone familiar with the Clydeside area will agree. *The new group purchased a site immediately adjoining the Clydebank Yard on the low side.* The south shore, as is well known locally, is not available for shipbuilding enterprise. To the east of the Clydebank Yard lies a great coaling basin. Vickers-Beardmore had cut off Brown's from extending their yard.

Here they had laid out the largest warship-building yard in the British Isles, with a splendid fitting-out basin, fine machine shops, and excellent yard equipment of every kind—as instance their extraordinary slipway accommodation. They enlarged at Park-head both shops and forges. Money was spent with so lavish a hand that the enterprise has never paid its way as it should have done on its turnover.

As battleships and armoured cruisers became more powerful and the medium-sized gun without a gun-house gave place to the big gun with barbette and complete gun-hood, a gun and mount-ing fitted into the body of the hull and not merely clamped on deck, builders like John Brown, Laird Brothers, the Fairfield Ship-building Co., and the Thames Iron Works, were put under a more serious handicap than before.

Armstrong Whitworth and Vickers and Beardmore had engine shops, forges, gun factories, armour mills, mounting sheds, shell factories. They could build a ship and make her ready for battle. This gave them an enormous advantage, especially in the foreign market. They could supply every item more cheaply and the whole creation most economically. They could make themselves respon-sible for the whole ship. They could, in fact, build not merely a

ship, but provide a fleet and all its equipment—battleships, cruisers, destroyers, submarines, dry docks, projectiles, everything. The three worked as one. Vickers and Armstrong Whitworth began to tender as one concern, and then sub-let the parts to Beardmore or joint subsidiaries, wherein Nobel's participated. They became, by 1903, more self-contained than the Royal Dockyards

Formerly, a foreign Power would order a ship's hull and guns to be built by Armstrong, its armour to be made by Cammell, and its engines by someone else. Now they had everything from one firm or the three firms acting conjointly.

The outlook began to become serious for Charles Cammell, John Brown, Laird Brothers, Thomas Firth, and the Fairfield Shipbuilding Co.—then all independent concerns. It was time for concerted action in self-defence.

Cammell began within a year of the Vickers-Beardmore amalgamation, and purchased the Mulliner-Wigley Works at Coventry, and there commenced to make gun parts. Next, it acquired Laird Brothers' long-established shipyard at Birkenhead —a firm of ancient origin in Port-Glasgow, by the way—and Cammell, Laird and Co. began to construct a new shipyard at Tranmere Bay, south of their old works, and on the finest foreshore site in the country.

Next they purchased half the capital of the Fairfield Co., and so brought to that great marine engineering concern, with its famous record for packet-boats, ocean greyhounds, swift cruisers and destroyers, their forge and armour departments of Sheffield. Then Cammell, Laird invited John Brown and Co. Ltd., to take half the shares in the new Coventry Ordnance Works, Ltd., late Mulliner-Wigley, and made over a quarter-share to the Fairfield Co. John Brown, meanwhile, obtained a controlling interest in Thomas Firth and Sons Ltd., projectile, gun-tube and steel makers, and brought about a new combination of Sheffield, Midlands, Mersey, and Clydeside enterprises.

This was the great counter-offensive.

The armament industry was looking up. Mr. Philip Watts had brought the "Elswick" cruiser into favour, and had produced a vessel that was, virtually, "a 22-knot battleship." There were rumours of a monster battleship of high speed, and the growing suspicion of Germany's intentions gave excellent promise of a new demand for still bigger ships.

There was a boom in cruisers, and Clydebank and Fairfield always have prospered on a cruiser boom. There was a great demand for armour, and both Brown and Cammell-Laird could supply this. It was only needful to furnish gun-mountings, and then the new group could vie with the old on terms approaching equality.

But to make gun-mountings efficiently is the hardest part of

armament manufacture. They are, at one, delicate and ponderous, they combine the arts of gun-maker and armour-producer. They are so liable to be failures unless the minutest care is taken. Their cost is stupendous—a pair of 12-inch guns and their mounting, then, requiring more than £100,000.

In 1904-5, the Coventry Ordnance Works resolved to make not only naval guns at Coventry, but to build a big erecting department at Scotstoun, and to compete with the big groups in their own speciality. This new establishment embodied "the most recent engineering improvements" and "the most modern description of plant." Five large erecting pits were provided, and the shops left nothing to be desired. The site was admirably chosen and well-served by transport facilities and land on which to extend. It lay between railway and river, half-way betwixt Fairfield and Clydebank.

It was probably anticipated that the Admiralty would be glad to emancipate itself from the monopoly of Vickers and Armstrong Whitworth, and that a share of naval armament would be required from the new Company, which was then supplying the Army with artillery.

Had the Fisher schemes gone propitiously and the Cawdor programme of four armoured ships (battleships and battle-cruisers) been adhered to by the incoming Liberal Government, it is probable that Coventry would have had orders for one quarter of the necessary mountings and guns. But the new Government reduced the Cawdor programme, and only provided for three ships in each of the years 1906 and 1907, and two in 1908.

Vickers and Armstrong Whitworth, having long experience and an acknowledged position, had prior claim. Besides, they seemed to have a hold on the authorities, who maintained with them relations "far more cordial than the ordinary relations of commerce." Apparently, these two firms did most of the experimental work for the Admiralty on the ships they built for South American Powers, and entered into peculiar dealings with nations hitherto not unfriendly to Germany, *e.g.*, Italy, Austria, and Spain.

Instead of 18 or 20 heavy mountings, only 14 or 15 were needed. It was no help to Coventry that Brazil was having two Dreadnoughts built here—for all their guns, machinery, armour, etc., were provided by Vickers and Armstrong Whitworth. The Russian cruiser, "Rurik," was the concern of Vickers and Beardmore. No orders for mountings came from abroad to Coventry, "because the firm was not on the official list of the Admiralty." No orders for battleships or battleship-cruisers came to Brown, Fairfield, or Cammell-Laird between 1906 and 1909-10. The Admiralty built two battleships or a battleship and a battleship-cruiser yearly at Portsmouth and Devonport, and gave out the

other ship to Barrow or Elswick. Worse and worse became the plight of the second group. The chairman of Brown's described things as "bad," and regretted that he saw "very little evidence of distinct improvement." "The heaviest plant at Coventry and the whole of the Scotstoun factory were lying idle." This was in 1909, and two years before this Cammell-Laird had been removed from the Admiralty list for "grave irregularities," and their 7½ per cent. dividend had slumped to *nil* and a dead loss.

Fairfield was also in the trough of industrial depression.

Brown and Fairfield had built and engined the battle-cruisers "Inflexible" and "Indomitable" in 1906. The next battle-cruiser was built at Devonport, though engined by Clydebank, and, after that, the "Lion" was also given to Devonport, but engined by Vickers. For four years Fairfield and Brown had no orders for Dreadnoughts, and for nothing larger than two 4800 tons light cruisers.

The owners of Scotstoun were getting into deep water, and they knew it. There is nothing more remarkable about the great scare of 1909 than the contrast between the silence of Vickers and Armstrong Whitworth and Beardmore, and the incessant wailing, imprecations, and protests of the managing director of the Coventry Co., and Mr. Sam Roberts, M.P., director of Cammell-Laird and trustee for Fairfield.

In May, 1906, immediately after the reduction of the Cawdor programme, Mulliner went to the Admiralty and warned them, performing "the public and patriotic duty" of telling them of Krupp's extensions. In 1907 and 1908 he again presented himself, smiting his breast and wailing :—

> "The naval policy of the Government was nothing less than a gigantic mistake, the possible consequences of which are almost too dreadful to contemplate."

And still no orders were forthcoming!

On 3rd March, 1909, he interviewed the Cabinet at No. 10 Downing Street, and spoke of "the enormous acceleration in Germany for producing armaments." They bowed him out, after pressing him sympathetically by the hand, and adjuring him to mention his little visit to no man.

This was one week after M'Kenna had told the lunch party following a launch at Barrow how cordial were his relations with Vickers and "another firm of equal magnitude" (Armstrong Whitworth).

Next, Mr. M'Kenna made his great scare speech on the Estimates of 1909, saying :—

> "It will tax the resources of our own great firms if we are to retain the supremacy in rapidity and volume of construction."

Mr. Lee, for the Opposition, said that Krupp's capacity exceeded that of all the works of this country combined. Mr. Lee put several questions that session in the interests of Coventry.

The late Colonel Vickers' reply to these jeremiads was crushing :—

> "I am speaking, of course, for our own Company only, but I think that what I have said will show you that, as far as the possible output of the country is concerned, the United Kingdom need not fear comparison with any foreign country." —*Annual Meeting of Vickers, Sons and Maxim, Limited,* 23rd March, 1909.

Meanwhile, a great shareholder in the Coventry Works, Mr. Sam. Roberts, M.P., had told the House that, "if necessary," Krupp's "could make the complete armament of ten battleships in one year"—a bag of moonshine, if nothing else! Again and again, this gentleman returned to the charge, and even suggested (Mr. Roberts was a director of the Sheffield Banking Company at the time) "the desirability of a naval loan."

In July the Government decided to build the four contingent battleships, thus giving the "patriots" the eight for which they wouldn't wait!

Mr. Asquith said they had now obtained "the facilities" for producing gun-mountings :—

> "Steps have been taken, and, I am glad to say, have been completed, and whatever deficiencies have been in this respect have been completely made good, and these orders . . . are to be given out without delay."

But not to Woolwich. Three days later, said M'Kenna to Crooks :—

> "We do not intend to place any orders (for gun-mountings) at Woolwich, for which, at the present time, there is no adequate means of manufacture."

Armstrong Whitworth had recently completed new "facilities"; Vickers were extending, and Beardmore were reported to be considering the erection of gun-mounting works.

That must have been what Asquith meant, but he did not exactly say so.

The orders were given out thus :—

One battleship to Armstrong-Whitworth.
One battleship-cruiser to Vickers.
One battleship to William Beardmore.
One battleship to Thames Iron Works.

Three sets of mountings (14) to Vickers and Armstrong

Whitworth; and one set (5) to Coventry Ordnance Works—for the "Conqueror," building at Dalmuir.

Next winter, the "Australia," battle-cruiser for Australia, was allotted to Clydebank, and the "New-Zealand," battle cruiser for New Zealand, to Fairfield, and their eight mountings to Vickers and Armstrong-Whitworth.

Beardmore had begun to make ordnance, and in 1909 supplied their first big naval guns to the Dockyard-built "Neptune." This move followed the Coventry move to make mountings on the Clyde. Then they abandoned the erection of mounting shops at Dalmuir, and, apparently, the "morning and evening hate" between Dalmuir and Parkhead, on the one hand, and Clydebank, Scotstoun, and Fairfield, on the other, has since come to an end.

That is how Capitalist competition profiteth a nation. In this case it swelled the Naval Estimates to gigantic figures, it called in enormous masses of socially unproductive capital and labour to the Clyde, and provoked a programme of waste as a result of a campaign, often prolific in lies, engendered suspicion and intensified competition between Britain and Germany.

If Coventry's ill-starred venture had fallen it might have dragged down Fairfield, Cammell-Laird, and Brown, and, at any rate, have gone far to drive them out of the armament market. Had they ceased to be Naval Contractors to the Admiralty they would have lost much mercantile custom.

On the other hand, Beardmore was swallowing capital, and giving an inadequate return. Each group, you may say, would have competed with the other to keep down prices. Yes! Until the minor group came into favour, and when both would combine to ask for more!

The Editor of the *Navy League Annual* describes this scare as "one of the most portentous pieces of Parliamentary humbug ever practised on the electorate"; whilst the *Naval Annual* (for 1910) remarked that whilst eight ships were ordered, six would have sufficed.

But six ships would have meant no mountings and no guns for Coventry, and, probably, no battle-cruisers for Clydebank and Fairfield.

And however the "scare" has affected the efficiency of the Navy, that was its origin.

The Struggle for Sea Power: Last Phase

In previous sections we have shown the course of development of British sea power and compared it with the German in the years between the passing of the Navy Law of 1900 and the great British programme of 1909-1910.

In 1910 the German estimates provided for three battleships :—"Prinzregent Luitpold," König Albert," and "Kaiserin," and one battle-cruiser, "Seydlitz." In 1911 the Germans voted and put in hand three more battleships : "König," "Ersatz Weissenburg," and "Grosser Kurfürst," and one battle-cruiser, "Derrflinger." In 1912 their programme was two Dreadnought ships, and in 1913 three ships. These are all that count for purposes of the present war. Probably, the 1913 ships are not yet fully ready for active service. The Germans returned in 1912 to a lower standard of construction, but passed another amending Act, providing for two additional Dreadnoughts to be laid down, one in 1913 and the other some time later. Their new ships have kept pace in tonnage, if not in gun-power, with our own later vessels.

The Admiralty voted four battleships in 1910 :—"Audacious, "Ajax," "Centurion," and "King George V.," and one battle-cruiser, "Queen Mary." In 1911 four more battleships : "Iron Duke," "Marlborough," "Emperor of India," and "Benbow," and the battle-cruiser "Tiger." In 1912 four fast battleships, and another, which was presented by the Malay States : "Queen Elizabeth," "Warspite," "Valiant," "Barham," and "Malaya," and five in 1913 : "Royal Sovereign," "Royal Oak," "Ramillies," "Revenge," and "Resolution"—again all battleships.

Meanwhile, from 1906 onwards, the Germans had been building two light cruisers a year, rising from the "Emden," of 3,592 tons, in that year, to the 4,832-ton "Karlsruhe " of 1911, and subsequent ships. The British built five in 1908, four in 1909, and three each in 1910 and 1911. In 1912 a new class of "destroyers of destroyers" was begun, and eight voted in each of the next three years. All the British light cruisers were heavier and more

powerfully armed than the German boats of the same type, but were, perhaps, not so swift. The Germans built a dozen destroyers a year; the British sixteen. The Germans were outnumbered by about two to one in submarines year by year. Such were the comparative building programmes of Britain and Germany.

Thirteen of the sixteen German, and nineteen of the twenty-seven British light cruisers, were given out to contract. Krupp and the Weser Company had the best share of the German work, Wm. Beardmore and Co., Ltd., of the British—seven boats. All the British vessels were built by firms in the "ring."

The British destroyers were built by eleven firms, the German by Krupp, the "Vulkan" and Schichau; our submarines mainly by Vickers, a few by Armstrong Whitworth (Lebeuf type) and Scott, Ltd., of Greenock (Laurenti), and by the Chatham Dockyard. The Germans had theirs constructed by Krupp and the Danzig Dockyard.

The Germans were completely outclassed by the British alone, without taking into account any of the Allied fleets. And not only were there the ships provided for in the Admiralty's own programme, but there were a number of other battleships which were incorporated into the Navy when the war broke out, the circumstances of whose building and initiation were altogether extraordinary. We have already referred to the mystery of the Brazilian Dreadnoughts, which, after having been mooted in April, 1904, were ordered in April, 1907, and of which *La Revue Maritime* writes :—

> According to the *Naval and Military Record,* and a great number of journals, if the horizon should darken at a given moment, there is every reason to believe that in the presence of menaces of a conflict, the English Government will have its hand forced, and that it will be with these three ships, as with the two battleships "Swiftsure" and "Triumph," bought in 1903 of the Chilian Government.

The third battleship, "Rio de Janeiro," was delayed, and on her, it was said, the Elswick firm desired to mount 15-in. guns, at a date more than a year previous to that when the Admiralty introduced these weapons into our own Fleet. Brazil not consenting to the gigantic expenditure that would have been entailed, Armstrong Whitworth resolved to arm her with seven pairs of 12-inch guns. She was so full of improvements that the *Engineer* conjectured she might inaugurate a new era in Dreadnought building.

More remarkable still, she was laid down on 14th September, 1911, within two months of the Agadir incident; we have it on the authority of Mr. Hurd that she was built to British Admiralty specifications and that she was fortunately kept back in British waters and not permitted to go out to the Turks as soon as she

was completed. Whereas the "Iron Duke" was built and commissioned in twenty-seven months, the writer saw the "Rio" on trials off the Tyne thirty-four months after commencement. Originally the "Rio de Janeiro," she passed to the Turks in December, 1913, the money being partly advanced by the Perier Bank, of Paris, and, finally, she was taken over as the "Agincourt" on the outbreak of war.

On 6th December, 1911, Vickers laid down the "Reshadieh" for Turkey. She was of exactly the same type as the "Iron Duke." She, likewise, though commenced a month before the "Iron Duke," was still without armament and armour in June, 1914, when Jellicoe's flagship had been in commission for two months. The "Reshadieh" is now the "Erin."

The "Almirante Latorre," laid down at Elswick on 15th December, 1911, for Chili, and carrying ten 14 inch guns (like the slightly anterior German battleships of 1911 should have had) was, of course, designed as a reply to two Argentine battleships and the Brazilian battleship, building on the next slipway. She is now the "Canada." Presumably, the "Almirante Cochrane," her sister-ship, laid down as soon as the "Rio de Janeiro" was launched, may eventually become British.

It was very fortunate that these four ships were laid down in the autumn and winter of 1911; that they so closely conform to British type; and that three of them were nearly finished in the summer of 1914. Of course, they figured in no official publication; Parliament was in no way responsible for them. The Government, disappointed of the three Canadian Dreadnoughts, and having in consequence to accelerate the three contract ships—"Ramillies," "Resolution," and "Revenge," found these three just as if they had dropped from heaven, ready to their hand. Again, we repeat, it was one of the coincidences of history, proving that Providence always favours those who fight for liberty.

Mr. Churchill had laid down in 1912 a constructional standard of 60 per cent. superiority in Dreadnought ships over Germany. Interviewed by the correspondent of the *Giornale d'Italia* in the autumn of 1914, he said:—

> "We started with a substantial naval preponderance, much more like two to one than sixteen to ten. In the next twelve months we shall have twice as many battleships completing . . . as Germany."

Of course, Germany knew this. Germany would have been only too glad to have had an equivalent if any one but Greece would have been foolish enough to go to her builders to order an assortment of vessels having a questionable battle utility.

The Navies of other Belligerents

One of the most curious circumstances of modern naval and military development and international relations was the dependence of the Italians in all that pertained to the fleet and artillery construction not upon the resources of their German ally, but on those of Britain and France. Nothing was more inexplicable than the reliance placed by the Italian Government, itself weak in those forms of national wealth so essential to political and economic independence, not upon Krupp and the German firms, but upon Vickers, Armstrong Whitworth and the French armament makers at a period when British and French Ministers of Marine were telling their Parliaments of the necessity of taking account, in the framing of all programmes, of the increase of the Italian Navy.

France had assisted Russia in the construction of her navy ever since the Alliance had been consummated. Britain had given similar advice and aid to Japan, and Germany was collaborating with Austria and Turkey; but Italy was the one exception to the general rule. For full half a century Italy has relied on the ship-builders and armament makers of Britain. Formerly, she gave her secondary orders to Germany, and, latterly, to France. From 1898 to 1909 Italy called a halt in her naval construction, but in March of the latter year, a new programme was announced. It was expected that 200,000,000 francs would be voted. For coast defences, 70,000,000 francs; for munitions, 8,000,000 francs; for the navy, 122,000,000 francs. This was the year after Austria annexed Bosnia-Herzegovina.

In June, 1909, the "Dante Alighieri" was commenced—Italy's first Dreadnought. In 1910 three more Dreadnoughts were commenced, and in 1912 and 1913 two Dreadnoughts a year. The armour-plate was ordered from the Societa di Terni, but most of it was actually furnished by the firms of Sheffield and Manchester and by the Bethlehem and Carnegie Steel Companies.

The great gun-mountings of the "Dante Alighieri" and the "Leonardo da Vinci" were manufactured in Barrow, and there is strong ground for believing that the 15-inch gun-mountings of the latest Dreadnoughts were in the Vickers shops in the middle of 1914. That is to say, the essential parts of the Italian battleships

were being supplied from this country by British makers at a time when Italy was allied with Germany.

Italy has several great armament and war shipbuilding companies. First is Armstrong-Pozzuoli, Ltd., of Naples. This concern was founded by Armstrong at the express request of the Italian Ministry of Marine in 1884, and Mr. George Rendel resigned his position as Additional Sea Lord of the Admiralty to go out to be resident manager. The Rome manager was Captain Albini, late of the Italian Navy, afterwards Senator Albini. In 1895 all the workmen were Italians, but the foremen were English. The managers were Italians, but the ownership was entirely in the hands of Armstrong Whitworth from its incorporation as a separate company in 1896. It was long in fierce competition with Gio. Ansaldo and Co., of Genoa, a firm of shipbuilders and armament makers, founded in 1853 by order of Count Cavour, and later directed by Signor Perrone. In 1903 Armstrong Whitworth—

> In view of their long connection with the Italian Government, and in order to strengthen the position of the company at Pozzuoli, and in other quarters . . . acquired an interest in the firm. (A.-W. Annual Report, September, 1904.)

In 1911 the official title of the company was La Societa Anonima Italiana Gio Ansaldo-Armstrong ed Co.

During the last four years shops have been erected at Sestri Ponente for making armour-plate and naval guns, and extensions were also made about 1910 at Pozzuoli.

Pozzuoli uses Terni steel. The Societa di Terni was also founded in 1884 as La Societa degli Alti, Forni, ed Fondieri, Acciaeri di Terni. In 1902 Orlando Bros., shipbuilders, of Leghorn; Odero and Co., shipbuilders, of Genoa, and the Societa di Terni purchased the Elban Iron Mines and formed a great metallurgical syndicate. In 1905 these and Vickers decided to erect a gun works at Spezia

> to complete in Italy the means of satisfying, in conjunction with the Armstrong Works at Pozzuoli, the requirements of the Government . . . in all that relates to gun and armament material.—(*Vickers' Prospectus,* 1908.)

In 1905.

This was the Societa Italiana Artiglieria ed Armamenti Vickers-Terni, whose chairman is Albert Vickers.

In 1906, Odero and Orlando Bros. formed the Cantieri Navali Reuniti (United Naval Shipyards) at Genoa, and Palmer's Shipbuilding and Engineering Co., Ltd., joined with La Société d'Automobiles "Rapid," of Turin, to form the Savoyan Motor-Boat Works.

In addition to these, Vickers-Terni and their combination were interested in the Fiat San Giorgio Co. at Muggiano (builders of submarines, etc.).

For all these concerns the British firms provided "technical" and "financial assistance," raw material, etc., etc.

So much for Italy.

About 1909 Vickers and Armstrong Whitworth joined with the Hokkaido Colliery Company and certain Japanese naval officers to form the Muroran Steel Foundry for the supply of guns, armour, and forgings for Japanese ships. This also was only a subsidiary, through which the British firms and, chiefly, Armstrong Whitworth maintained their grip on Japanese custom.

The Rothschilds of Japan, the Mitui Bussan Kaisha, meanwhile acted as agents of Vickers until they were involved in the unsavoury "Kongo" scandals.

The Japan Explosives Co., Ltd., had a small works near Tokio and acted as agent for the explosives manufacturing interests who owned it—Armstrong Whitworth and the Nobel Dynamite Trust.

In 1910 Japan undertook the construction of four battleship-cruisers, amongst them being the "Kongo" and the "Hiyei," in connection with whose contracts Vickers and other British armament firms were seen in somewhat unfavourable light.

About this time Japan also laid down several giant battleships.

So multitudinous have been the interests operating in the rehabilitation of Russian naval and military power, and giving to this Empire with undeveloped industries their financial, technical and manufacturing assistance, that one hesitates to attempt an analysis.

Russia needed completely to reconstruct her navy after the Eastern débâcle, and was caught by Germany with the task yet far from achievement. Her expenditure on this count rose from 87,700,000 roubles in 1907 to 250,398,000 roubles in 1914.

In 1905 Russia had ordered a heavy-armoured cruiser, the "Rurik," from Vickers, but after that there was a cessation of new building for some time. In March, 1906, however, the Czar sanctioned a programme to be spread over a period of nine years, and in the summer of 1907 Admiral Skrydloff came to Paris to make arrangements for the reconstruction of the Russian fleet. It was said in the British Press at the time that France insisted that she was entitled to the greater part of the orders for new warships.

> The granting of orders for warships in France being one of the conditions attached to the floating of a new Russian loan in France.—(*Naval and Military Record*, 6th June.)

Russia wanted to have her ships built partly in Germany and partly in Britain—a very tactful bargain for her! As Russia was to spend 1,600,000,000 francs on her navy in seven or eight years, it was quite reasonable that the Crédit Lyonnais, the Comptoir d'Escompte, the Union Parisienne and the Perier Bank should watch the interests of the Acieries de la Marine, the Chantiers de

la Méditerrannée, Schneider and the Chantiers de la Gironde, to whom they were respectively related.

There was considerable delay in the commencement of the Russian warships. In 1908 it was resolved that they must be built in Russia, of Russian materials and by native labour. Previously, the choice of builders had narrowed down from British, French, and German, to British and Italians, and now was restricted to Russian yards. Again and again the Duma refused to vote the Naval Budgets, but finally orders were placed, workers were engaged, the Baltic and New Admiralty Yards entered into agreements with John Brown and Co., Ltd., late in 1908, and on 16th June, 1909, the keels of four battle-cruisers were laid. In October, 1911, three battleships were begun for the Black Sea Fleet, two at the Nikoliaev Dockyard, and one in a private yard there.

Two of these were built under the supervision of John Brown and Co., and the other at the Nikoliaev yard of Vickers, Ltd., who had leased a Russian establishment originally put down by a group of Belgian financiers in 1895.

The Putilov Ordnance Works, La Metallurgique de Petrograd, The Russian Society, and Lange Becker and Co., were all busily employed on the construction of cruisers and destroyers.

Lange Becker and Co. is a mere branch of Normand et Cie, of Havre; the Franco-Russian Works, which engined two of the Baltic Dreadnoughts, is controlled by the St. Chamond Co., Marrel Bros. and the Chatillon-Commentry Co., of France. La Providence Russe à Mariupol is another Chatillon-Commentry subsidiary. Schneider dominated the Russian Society, and are involved in the Mytovilinsky Arsenal at Perm.

The great French companies, together with Vickers and John Brown, have been steadily driving the German interests out of Russia for some years past.

Skoda had tried in vain to secure a concession for a steel works adjoining the Putilov and Nevski Works at Petrograd and, probably, had the war been a little longer deferred, Putilov would, with the help of Vickers and Creusot, have become much less dependent on Krupp for its steel supplies. There is reason to believe that the armour-plate works at "Nikopol-Mariupol were also dependent largely on Krupp for raw steel.

In naval, as well as in military, requirements Russia has been terribly handicapped by the undeveloped nature of her metallurgical and armament works. For much of her raw materials she has been dependent on Germany and Austria, whence also she has obtained many machine tools. Guns, engines, and armour have had to be imported in large quantities from Britain and France, with the result that when war broke out she became virtually isolated and deprived of the essentials of naval armament.

It was for this reason that her immense expenditure of recent years and her colossal preparations availed her so little. Germany struck before Russia had time to complete her new establishments, let alone to set them to work.

In 1912 Russian naval outlay rose 55,000,000 roubles; in 1913 another 62,000,000 roubles, and in 1914 by 22,000,000. For 1913-14 the Russian Naval Budget was only £223,000 behind that of Germany.

For the time being the advantage accrued most obviously to the Franco-British owners of armament and steel works.

The share values of the Nikopol Mariupol Works rose from 50½ in 1909 to 293½ in 1913; of the Putilov Works, from 76½ in 1908 to 145½ in 1913, and the dividends of La Metallurgique de Petrograd rose from *nil* in 1909 to 12 per cent. in 1912.

As Russian expenditure on the Navy rose, so did that of France, and with its increase went the improvement of French armament dividends.

From the spring of 1905 there had been a growing tendency in France to demand and to undertake increases of naval preparation. The estimates of 1906 provided for the construction of six battleships, which were commenced, four in 1907 and two in 1908. Thus M. Thomson completely reversed the economist policy of M. Pelletan, the Radical, and prepared the way for a great naval revival in France. In 1906 the French main fleet was stationed at Toulon, and only three battleships and six cruisers were maintained in the Channel. At the same time the Minister of Marine stated that twenty more battleships were needed. The autumn of 1908 saw in France, as in England, an agitation for naval re-organisation, and in January, 1909, *Liberté* foretold a sensational increase in the near future. When our alarmists were shouting "We want Eight!" *Le Temps* was bemoaning the "complete stagnation" of the French fleet. The same week that Mr. M'Kenna announced that the four contingent battleships would be laid down, Admiral Boué de Lapeyrère became Minister of Marine in France, and began to frame his new proposals. The new programme for 1910 was to be increased by 38,000,000 francs, and there were to be Supplementary Estimates for three new battleships, and in the same autumn. the dockyards, private shipyards and armament firms began their preparations. In February, the Cabinet approved the draft Bill for twenty-eight battleships and armoured cruisers to compose the fighting fleet, and ten cruisers for distant service, to be ready by 1922. When the Radicals and Socialists began to secure modifications in the scheme, Lapeyrère resolved on an Organic Navy Law, which should remove French naval expenditure from the Chamber of Deputies, in the way that the Navy Law of 1900 had removed German naval expenditure from the control of the Reichstag.

"To settle the programme of construction for the next ten years, and once for all the class of ships, as well as the construction of the fleets required by France, is the aim in view, and, indeed, it seems the only means of safeguarding the position of the Republican Navy among naval Powers, and of ensuring the rational employment of the Navy Estimates. (*Naval and Military Record.* 16th February, 1910.)

The new law which was passed in 1910 provided for the maintenance of two squadrons in the Mediterranean and merely stationed a coast-defence force in the Channel, where, said the *Naval Annual,* 1910—

doubtless the Admiral anticipates that France will find a naval ally.

In 1912 M. Delcassé, when Minister of Marine, decided that the programme should be completed by 1919, instead of 1922, and that not two but four ships should be commenced in 1913. These were to be ready by the summer of 1916.

In 1913 M. Delcassé was succeeded by M. Baudin, President of the French Navy League, who brought in amendments for the construction of three more battleships and for acceleration. In the same year, Chamber and Senatorial Committees approved a Supplementary Programme of eight battleships, and the Chief Secretary to the Marine desired to have not twenty-eight, but an establishment of fifty-four battleships. France was, avowedly, setting out to compete with Germany "at sea as well as on land."

In 1914 the French Vote for new construction was £10,730,520; that of Germany £10,674,033. The 1913 ships were to cost £3,400,000 each, and were to carry twelve 13.4-inch guns. More work was being given out to the private builders, and the "absurd monopoly" of the State arsenals on every hand was being broken down.

The armament firms, since 1903, associated together in two great syndicated chambers of warship builders and makers of war material, were reaping great profits from the revival of naval extravagance as well as military preparedness.

La Société de la Marine increased its profits from 6,817,000 francs in 1908 to 13,567,000 francs in 1913; Les Ateliers de St. Nazaire from 2,229,000 francs in 1908 to 4,034,000 in 1912; the Chatillon-Commentry Cie. from 7,756,000 francs in 1908 to 13,162,000 in 1912. In 1913 Schneider et Cie. paid 20 per cent. and their 360 franc shares were selling at 2,210 francs.

The armament providers of all the belligerents were enjoying a great period of prosperity from naval contracts, but more particularly those of the Entente Powers.

Germany and Austria were by no means keeping pace in the contest for sea power, and the war came with Austria in a very defenceless position on the sea. Her Dreadnoughts, like those of

Russia, were only slowly completing, and her programmes were being deferred by the scarcity of money she had to spare for this arm of her forces.

Four Dreadnoughts were building at Trieste and Fiume, but it is doubtful whether these were finished before 1915. There were constant rumours of new construction for some years before the war, but these always died away when the question of expenditure was brought forward.

Except for submarines and destroyers, the Austrian Navy hardly counts at all.

As for the Turkish Fleet, this was so effectively organised and provided for by the mission sent out by the British Admiralty in December, 1908, when Admiral Douglas Gamble became Naval Adviser to the Turkish Government, that the "Reshadieh" was ordered of Vickers, Ltd., and put in hand in December, 1911; the "Rio de Janeiro" was purchased from Brazil in December, 1913, for about £3,000,000, part of the money being advanced by the Perier Bank, of Paris, the ship being renamed "Sultan Osman"; and the "Fatih" ordered from and commenced at Barrow in the spring of 1914.

The ships were contracted for by private arrangement with the British group, which, subsequently, leased the Stamboul Arsenal and Dockyard for a period of years, formed the Imperial Ottoman Armament and Dry Dock Co., with directors appointed by Vickers, Armstrong Whitworth and the Sublime Porte, and was busy reorganising the Dockyard when hostilities put an end to their efforts.

The "Reshadieh" had already become the "Erin," and the "Sultan Osman" the "Agincourt," and both ships went to swell the Grand Fleet. The workmen came back from Constantinople, and Vickers and Armstrong Whitworth refunded such bonds as had been called up.

Military Equipment—1904-1914

THERE IS much less to be said concerning the military armaments of the period 1904-1914 than about the naval preparations, and this for several reasons.

Naval armaments are, by their nature, more spectacular, and have been more interesting and important to the English-speaking world. There has been no great attempt to conceal the developments of warship construction and, had there been, it would have been well-nigh impossible to keep secret the general characteristics and numbers of any but the submarine flotillas. Dreadnoughts, cruisers and destroyers cannot be built without attracting attention, and cannot very easily be kept in a semi-manufactured condition. The primary armament of capital ships is standardized by the design and stability of the vessels. Before a fleet can have its 13.5 in. guns replaced by 15 in. guns a new class of warships must be evolved at enormous cost, and prodigious constructional effort.

Flotillas of light cruisers and ocean-going destroyers cannot be built, and held in reserve from the eyes of enquiring neighbours. Only submarines lend themselves to secret construction and, though both Britain and Germany were building these in numbers unspecified in their published programmes during the months before the war, in this country, at any rate, the mere layman was able to make a fairly accurate estimate of the number building and the rate at which they were forthcoming. The exact nature of their torpedo armament and gun power was, however, capable of concealment.

But all the large craft, on which sea-power still ultimately depends, require so long to build and complete that a sudden spurt of effort can never be left until the outbreak of hostilities, when the cloak of privacy comes down on all that the Admiralties are doing.

This publicity is not, however, an essential of military preparations. Here it is possible to keep a very great deal of information from percolating into undesirable channels. Espionage and the transmigration of technical secrets had become so general in Europe before the war that every new device was most carefully safeguarded, and the intricacies of breech-mechanism, of loading,

of recoil absorption, and of fuse adjustment were treasured and kept from prying gaze more resolutely than the mysteries of Eleusis.

France and Germany, Austria and Russia, each sought to keep from each other's artillery, transport and engineering corps the continuous improvements of their armament and supply services and to worm out the jealously-kept secrets of their rivals.

The artillery journals of the last decade tell us infinitely less than those of the "eighties" and "nineties." For all the interlocking of armament control and the common interests of capitalist salesmen, official secrets seem rarely to have escaped from the bureaux of the great contractors to those of their associates. They "pooled" their supplies of raw material; they worked many patents in common; they participated in profit-sharing but, save to the allies of their country, their intimate secrets were absolutely barred.

There have been three cycles of field artillery rearmament in the last twenty years. The first of these marked the definite adoption of the quick-firing gun, between 1896 and 1899. The second of these comes between 1903 and 1906, and the third, between 1909-1912.

In fact, no sooner was one cycle of armament completed than some country began a reorganisation, in which all others joined. For thirty years, the belligerents in this present struggle have, every five or six years entirely overhauled their military armaments. Maybe, they began by rearming their field artillery and then provided new batteries of howitzers. Next their fortresses and coast defences called for attention, and these would no sooner be dealt with than a new pattern rifle and a more rapid-firing machine gun engrossed their care. Germany's field artillery would be outclassed by some new Schneider weapons, and then Krupp and Ehrhardt would readjust the balance whereupon Chatillon-Commentry regained the lead and Skoda, meanwhile, made a St. Chamond howitzer of no avail. So the merry, mad business went its ruinous way.

The Russian field artillery was completely armed by Putilov in 1903, before the Japanese War. In 1911-12, a reorganisation was begun. A Schneider mountain-gun was adopted, probably for use in the Carpathians and Caucasus, and in 1913, a Schneider gun for the horse artillery. Only 138 guns had been supplied when war broke out. The supply of the new Deport field gun was scarcely even commenced. This was to have been made by the Russian Artillery Co., at Tsarytsin on the Volga, where Vickers Ltd., together with the leading banks of Petrograd, were to manufacture artillery on the Deport system of the Chatillon-Commentry Co. The raw materials were to come from England, the steel from French subsidiaries in Russia, and the technical direction was to

be afforded by Vickers and the French firm. The new company had scarcely begun work when war broke out.

Russia's heavy material was, and is derived from Putilov and Abouchoff, as well as from the Izhora Steel Works and Perm Arsenal. The War Department also has a gun factory at Petrograd (the Alexandrovsk Works). Her explosives were obtained from Ochta and about half-a-score other great powder factories. One source of supply was the Russische Gesellschaft für Pulverfabrik, an offshoot of the ubiquitous Köln Röttweiler Pulverfabrik. Another was La Société Franco-Russe.

Her small arms factories are mainly grouped around Toula, near Moscow, where the industry dates back to 1696, and the reign of Peter the Great; but, probably, the shutting off of German and British machine tool supplies has been felt disastrously.

Russia has dozens of steel works and arms factories, foundries and explosives sheds, but none of them are highly developed, and very few are independent of foreign sources of supply and technical assistance.

Italy is much less at the mercy of other countries, but her works are mainly supported by foreign capital. Formerly she relied greatly on Germany but, during the last ten years she has come to lean more and more on British and French armament resources.

We have already spoken of her naval yards and workshops.

In 1906, finding its Terni designed field guns unsatisfactory, Italy placed orders with Krupp for 105 batteries. Before Krupp had completed delivery, which was to be by November, 1911, Italy adopted in 1910 the Schneider and Deport systems of field artillery. With the earlier armament unfinished, our southern ally voted £2,000,000 for the new systems.

The Schneider patents were leased to Gio. Ansaldo Armstrong and Co., of Genoa, and experts were loaned them until they could collect a skilled staff of their own.

The Vickers-Terni Works at Spezzia secured the lease of the Deport patents from the Chatillon-Commentry Co. in 1911, and were making the gun-parts in their own departments, sending them across to the State Arsenal to be assembled under the supervision of the Italian artillery officers.

Terni was making rifles in 1912 and Armstrong-Pozzuoli supplied nearly all the heavy howitzers, siege guns, and fortress artillery for the Alpine defences, on which great sums were being spent between 1909 and 1914, when the Pozzuoli and Sampiaderna works of Armstrong were being greatly extended.

France, who put her reliance and, certainly, her undue reliance on quick-firing field artillery, undertook a great reorganisation of her artillery to be completed by March, 1911. She provided many additional field-gun batteries, chiefly on the Schneider

system, the famous "75." In 1913, yet another increase of field artillery was undertaken, and the French appear to have put their trust in this arm to an extraordinary degree. For some reason or other, the heavy howitzers projected in 1911 were not proceeded with, and the war found France without those great guns wherewith Krupp had so liberally supplied Germany.

France seems, however, to have been fairly well equipped with machine guns, chiefly of the Hotchkiss and Nordenfeldt types, but not to the same extent as Germany. Her outlay on and provision of armoured motor cars, motor gun-carriages, and motor transport appears to have been adequate and, here, Schneider and the other armament firms were well supplemented by the highly-developed motor industries of the Republic.

Belgium's artillery was equipped partly by Krupp but mainly by Cockerill, of Seraing, who were given large orders in the spring of 1904, and her small arms were furnished partly by the State factory at Liège and partly by La Fabrique Nationale des Armes de Guere à Liege, a company almost entirely German in ownership and control, lessees of the Mauser rifle patents. One of the grim ironies of the war was the spirited defence of this factory at Herstal by its employés against German infantry armed with the Mausers of their own employers' home manufacture!

Serbia's artillery is of Schneider manufacture, and Bulgaria's weapons in the Balkan campaigns were also of Schneider manufacture.

In fact, during the Balkan wars, Krupp artillery received a rude shock to its prestige, and much alarm was felt and expressed in German military circles at the extraordinary success of the French field guns.

Schneider and Krupp, all through the first Balkan war, engaged in an astounding campaign of inspired newspaper advertisements of the merits of their respective weapons, their subsidised press agencies and cable services providing the journals of Oriental and other minor Powers with lengthy dissertations on the prodigious destruction wrought by their several productions.

Seven of the minor Powers resorted to Schneider, and eleven to Krupp for their artillery, and the former was resorting to the most amazing devices to equalise and gain the advantage.

Totally inadequate as were Germany's preparations to assert her influence upon the seas or to safeguard her commerce, her military armaments have been developed on a gigantic and very cleverly executed plan. The technique of German militarism is extraordinary, and the machine has been brought to the highest pitch of efficiency. The rapidity with which her armies took the field at the outbreak of war; the adequacy of every grade of ammunition and of all manner of stores; the overwhelming number and weight of her artillery; the multiplicity of her machine

guns and the readiness with which her commanders have accustomed themselves to the changing conditions or transferred army corps after corps from one front to another, have seemed the wonder works of some latter-day Cæsar, adding to his incomparable genius as strategist all the devices of mechanical barbarism.

System characterises the German administration from top to bottom, and the war-machine is supported by all the resources of the most highly developed capitalism in the world. Finance, diplomacy, industry, science, have all been co-ordinated, and over the ground which they have made ready, the great General Staff has executed the plans patiently and thoroughly worked out during long years of intensive study.

The writer believes that Germany has had a clear idea all along in which direction she would move when her neighbours began too much to circle her about, and exert too severe a pressure on either frontier. He does not believe that, the Kaiser's rhetoric and Tirpitz' ambitions notwithstanding, Germany has contemplated a future on and beyond the ocean or that her Moroccan and African diplomacy was other than a manœuvre to deflect her rivals from the true line of her advance into Western Asia.

He draws the conclusion from a very careful study of her naval policy that however willing she may have been to persuade France and, especially, Britain that she was seeking her future on the sea, she has been continuously preparing for expansion in a direction where her military strength would avail her most and Britain's sea-power would be of least account, viz. : through the Balkans to Syria and Persia.

That way opens before her the surest prospects of success and the minimum of effective opposition.

All her allies are nations with traditions military rather than naval; all are weak in industrial and commercial development, and two of them are seriously menaced by powerful neighbours to north-east and south-west.

In this war, and in the preparations for it, these allies have been almost entirely dependent on Germany for their military equipment, and have fallen under the industrial domination and financial overlordship of their mighty protector. From them, the metallurgists, machinists, chemists, and commercial classes of Germany have come more and more to realise they would have to draw the raw materials of manufacture and trade which should sustain in war-time the industrial power of the Fatherland.

The Germans have made exceptionally good use of their railways, and have owed no small part of their success to the excellence of their communications, now continuous from Lille to the borders of Egypt and to the middle of Russia. Their railways they have supplemented by the river carriage of the Rhine,

Danube, and Tigris, and by an immense utilisation of motor transport.

The Deutsche and Dresdner Banks and the Wiener Bankverein have formed railway companies and secured concessions to open up the Balkans and Asia Minor, and then have secured immense orders for material and rolling stock from these concerns for the numerous steel works and rolling mills in which they are jointly or severally involved. Almost all Turkish Government orders for railway material and public works have been given to Germans for many years back, and the most valuable mineral concessions have likewise been secured by the Deutsche, Disconto Gesellschaft, Darmstadter, Dresdner, and National Banks for their metallurgical subsidiaries in Westphalia, Silesia, Moravia, and Bohemia.

From about 1900 onwards, the Ottoman Government showed a predilection for Krupp artillery in place of that of Armstrong Whitworth for naval as well as military purposes. With the exception of material seized from Serbia at the outbreak of the first Balkan war, nearly all the field gun, howitzer and mountain artillery of Turkey is of Krupp manufacture. About forty batteries of field artillery had been ordered from Vickers Ltd. in 1914, and was in process of manufacture in Sheffield during the summer, but, of course, was added to the rather scanty equipment of the British Army. The lighter arms were almost all of German origin, the rifles being Mausers and Mannlichers.

Whereas Turkey had a complete field gun armament from Krupp of 1904 pattern, Bulgaria had a Schneider equipment of 1905—but that was in the anti-Turkish days. All her land armament was of Schneider make, and it is only since the First Balkan War that Bulgaria has had guns from Germany. Hitherto, as the protége of Russia, she was a patron of Schneider et Cie.

Austria, whilst still nominally independent, appears to have fallen entirely under the control of Germany in matters military and naval. This is merely an extension of a process that had already gone very far in the direction of her armament firms, and which has been most characteristic of the last dozen or fifteen years.

The greatest of all the armament firms of Austria is the Skodawerke, of Pilsen. This was founded by Emil von Skoda in 1869 as a steel foundry, and remained a purely commercial venutre until 1886, when Skoda began the production of armour-plate for land defences. In 1888, he supplied his first howitzer mounting for a 5.9 inch mortar, and secured the patent of a new machine gun.

In 1889, he began to manufacture the field and other artillery which the Russian armament outlay determined Austria to provide forthwith. In 1896, new gun-shops were erected, and the construction of naval ordnance was begun. Skoda capitalised his firm

before his death in 1900 and floated it as a company with the aid of the Credit Anstalt and the Bohemischen Escomptebank.

In 1903, the close relations for some time maintained with Krupp were given concrete expression in an agreement providing for the interchange of gun-patents, and Skoda became, virtually, a subsidiary of Krupp. Next year they both became involved in the Putilov Works, to which they supplied gun-steel, even if they did not interchange patents with them.

This arrangement, no doubt, worked out disastrously for the Russians when "the best smelted steel of Krupp" was no longer available owing to war.

As late as 1908, Gio. Ansaldo Armstrong and Co., of Genoa, submitted to Spain a ship plan with guns of Skoda type. This Skoda firm had iron mines in Cumberland, and in 1912, together with the Hartenberger Cartridge Co. and the Oesterreichische Waffenfabrik secured orders for artillery and small arms from China in return for the loan of money by its Viennese bankers. It was in a fair way to become as ubiquitous as Krupp.

In 1909—the year after the Bosnian crisis—great extensions were made at Pilsen, and the State placed orders worth 7,000,000 kronen, which were to be completed by 1914. In 1912, the artillery and machine shops were again enlarged, and next year the company entered into an agreement with the Hungarian Government to erect a great ordnance works at Gyor, in which the State should invest 7,000,000 and the firm 6,000,000 kronen.

The Skodawerke is also closely related to the Oesterreichische Daimler Motoren Gesellschaft, whose chairman is Von Skoda. In 1912, the Skoda Co. began to mount its heavy howitzers on Daimler motor carriages, and it was these monstrous 28c. pieces which wrought such awful havoc on the Belgian and Polish fortresses.

Another great Austrian munitions factory is the Witkowitz Coal and Iron Co. of Moravia, which normally employs about 20,000 men, and makes armour, gun-tubes, shells, cupolas, and gun-mountings.

It is a participant in the Steel Manufacturers' Nickel Syndicate Ltd., of Vickers House, Westminster.

Yet another large firm is the Oesterreichische Waffenfabrik, of Steyer, at whose head was Mannlicher, and which supplies his famous rifle to the Austrian Army. This works dates from 1830. The original owner, Werndl, had his rifle accepted in 1867, the year after the Austrians had learned the terrible effect of the Dreyse needle-gun at Sadowa, and had incorporated his company in 1869. In 1878, this works had a war capacity of 500,000 rifles and bayonets a year, and employed more than 3000 men. There, are made Mauser, Gras, and Mannlicher rifles, and the company is now associated with the Deutsche Waffen und Munitions-fabriken, and Gebr. Bohler and Co.

Dr. Paul von Gontard, managing director of the German company is the connecting link here, as in so many other enterprises. The Nobel dynamite combination also has works at Prague.

The bewildering syndication of the German metallurgical trades related to the Löewe-Krupp-Nobel interests seems to be endless, and the ramifications and international relationships well-nigh infinite.

Associated with this three-headed monster, and dominated by Löwe, is the Daimler Motoren Gesellschaft, which, in turn, controlled the Mercédès Société Française d'Automobiles à Paris, which trades in France and the French Colonies. It was represented here by the Milnes-Daimler Mercédès Co. Ltd., which was controlled on this side by the Chilworth Gunpowder Co. Ltd., a subsidiary held by Vickers, Armstrong Whitworth, Nobels, and the Köln Röttweil Pulverfabrik. Indirectly, it had a large holding in the Oesterreichische Daimler Motoren Gessellschaft. This Austrian associate of the Skoda Werke also had British connections, owning, half the share capital of the Beardmore Austro-Daimler Aero Engine Co. Ltd., whose other owner was Wm. Beardmore and Co. Ltd., and whose work is executed by the Arrol-Johnston Ltd., of Dumfries, a concern in which Sir Wm. Beardmore holds three-fourths of the shares.

To Krupp, for the innumerable batteries of all the many differentiations of his artillery from the trench mortar and the tiny mountain gun to the immense howitzers, with which they have shelled Dunquerque at 25 miles range; to Ehrhardt, for his field guns, and his many pattern pieces; to the Deutsche Waffenfabrik, for the bewildering parks of machine guns and the thousand thousand automatic rifles, magazine rifles, and myriad rounds of small arm ammunition; to Daimler, Augsburg-Nurnberg, and others, for the colossal fleets of transport wagons to the Köln Röttweil and others of the "Pulver Kartel" for high explosives and charges, to these the Imperial Government has turned, not to many each working for itself but to one highly-organised system of collaborators, operating together for common ends, at once, for private gain and national strength.

It is not easy to review the more recent preparations of Germany for military warfare. One reads of army corps decreed, of barracks and depôts constructed, of millions voted but little of how they were spent in the factories of the armament firms.

In April, 1912, a new Army Bill was brought into the Reichstag to provide for two new army corps, one on the east, the other on the west, and other increases to absorb an extra £22,025,000 up to 1917.

These were explained as being changes rendered necessary by the shifting of the balance in the Near East consequent on the weakening of Turkey.

It was this which provided the official case for the French reversion to the Three Years' Service decided upon on March 4th, 1913, this and the impending increases threatened by Germany. This was to add 230,000 men to her peace strength, a non-recurring expenditure of 440,000,000 francs, a lowering of the age for enlistment from 21 to 20, anl a further 144,000,000 francs to the annual cost of the army.

Within a month, a new Army Bill was published in Germany providing for an increase of 136,000 men, for the calling up of 63,000 more recruits a year, for three more regiments of garrison artillery, for many more machine gun companies, for a non-recurring expenditure of £52,000,000, and an annual increase of £9,500,000 on the Army Vote.

Betthmann-Hollweg blamed this on the French Three-Year Service reform and a Russian Army reorganisation "such as she never had before."

Germany was arming and rearming herself to the teeth, and must have been giving far more attention to her material than any of her neighbours credited to her. From 1912 to 1914 Europe's forges and machine shops roared and shrilled with the growing pace of armament preparations.

Woolwich Arsenal was working day and night on shells, and Vickers Ltd. had enough orders in July, 1914, to keep them on full time for two years. The presses of Sheffield groaned with work on projectiles for Italy, Turkey, Russia, and Britain. Russia was rearming her artillery, adding new army corps and considering the expenditure of £260,000,000 on strategical railways on the Polish frontiers. In June, 1914, she set aside £100,000,000 for the year's needs of her Army alone. Belgium was introducing Universal Service in the winter of 1912-13, and increasing her peace strength from 35,000 to 57,034 men in 1914-15. Her 1913 contingent was increased from 19,000 to 32,000, and her war strength to 330,000 men. Already the conduct of military operations and mobilisation had been transferred in March, 1912, from the War Minister to a General Staff, a change which our Annual Register (p. 358) describes as "considered a victory for the militarists."

Austria was calling up 31,300 more recruits, and had kept half her army mobilised during much of 1912-13.

Everywhere the drums of Armageddon were rolling more insistently for a struggle now not long to be deferred.

The Coming of War

When, in August, 1914, modern European civilisation seemed suddenly to collapse, and the primal instincts of men to leap up in the horror of a world-wide war, it was really nothing else but the culmination of a mighty struggle which had become intensified with each succeeding year. When Germany and Austria faced Britain, France and Russia on the battlefields the belligerent Powers were only continuing an old quarrel in a new and more destructive manner. The organisations of conflicting interests represented by the several States and Empires had really been at silent but eventually ruinous war for many years. Just as new nations have come into the conflict since the commencement of active hostilities, so neutral Powers joined France or Germany in the preceding stages of diplomatic antagonism.

The invasion of Belgium, like the threat to Serbia, was only a dramatic incident, which brought the difference to a head or provoked a breach at the psychological moment.

Grave issues of economic interest had sooner or later to be settled between the great capitalist groups dominating the Central Powers and the Quadruple Entente. Not merely outlets for production and areas of colonisation were the stakes for which the Empires contended, but the essential supplies of raw material for the industrial developments probable to ensue over years to come. It was not so much the world-wide nature of commerce that occasioned the Great War, but the change in production which has come about in the last generation. Rival industrial groups naturally endeavour to monopolise the best sources of raw material and to shut their competitors off from access to supplies essential to successful manufacture. It has been contended by many economists that people do not trade as nationalists, and that distinctions of "my country" and "thy country" are utterly unreasonable. Such ideas may be, and probably are, retrogressive and should be combatted by all clear-sighted students of public affairs.

Nevertheless, as the world is organised to-day, and in the present political chaos of jealous State systems, men and corporations do traffic as Britons and Germans in certain very important

industries. It is in the interest of the State to secure for its munitioners the amplest, cheapest and rarest reserves of material, and to encourage and assist them in this quest. Likewise, is it in the interest of the State to cast every obstacle in the path of the armament providers of any Government with which it is not, for expediency, in alliance.

There are many who ridicule the idea that the armaments interest has been largely responsible for the present war, and it is certainly very easy to attribute too much importance to the machinations of Krupp, Schneider, and Vickers. But the critics would do well to think again before they speak and to examine the economics of modern warfare. War is no longer a matter, on the munitions side, of a few smooth-bore bronze or iron cannon firing a spherical shot or a primitive case of shrapnel, grape or chain-shot with a charge of black gunpowder; of a musket discharging about one, or at most, two bullets a minute, a few volleys and then a charge with cold steel; a regular siege, of a ring-fortress, with mortars, howitzers and siege train. The whole character of military transport is as utterly revolutionised as the traffic of our cities; the facilities of defence and offence now utilise all the finest devices and methods of the engineer, the electrician, and the chemist; the wounded are not left to die of rot, or to become totally incapacitated : they are repaired by a wonderful surgery and hurried back to the firing-line. An army no longer lives on the countryside and by requisitions, it is fed and clothed, aye, and housed from Chicago and New York and the lumber camps of the Rockies. Battles do not continue from sunrise to nightfall, or even for ten days, and then leave the antagonists a breathing space of many weeks. The conflict goes on continuously over the same ground for months, and for more than a year. The requirements in men are larger than of old, but those in material are immeasurably increased, both in amount and in variety.

Machinery and science have conquered war in a revolution much more rapid than they accomplished in the arts of peace; and for this reason : war is a matter of organisation, and brooks no delay. A nation can tolerate a slow and wretched railway system in one county area for years, and yet not succumb, but it cannot wait a month for the most efficient service of munition wagons on a single sector of the Front ; it can permit its babies to die by tens of thousands in the reeking slums of its cities, but a means must be found at once of countering an attack by poison-gas and of turning it back upon its originators; a company may dispense with the latest machine calculators, typewriters and department telephones, but a regiment must have automatic rifles, adequate field telephones, and electric batteries to charge its entanglements, or the line will be broken and the campaign lost. Everything must be the best procurable—money must be a mere means to an end.

Herein we have the explanation of much that is new in modern war and in contemporary statecraft. Germany must have the largest, the finest and the most guns—so must Britain and so must France. Her guns must be the most accurate, the swiftest in fire and reload, the longest-lived—so must theirs. Her gun steel must be the most flexible, the toughest, the least susceptible to erosion—so must theirs. As with her guns, so with her explosives, her small arms, her every munition and every mechanical, metallurgical and mineral element of her munitions—and so must theirs.

Krupp, Mauser, the Köln Röttweil Pulverfabrik must search out the best combination of these three elements of the perfect munition, and they must explore the Balkans and Asia Minor and Morocco and Sweden for the ore-bearing rocks, and when they have found them they must secure them, monopolise them for themselves and for Germany. They must have railways and ships to bring the ore and the metal home, and German arms and German diplomacy must guard the road along which they are to come to Cologne and Carlsruhe and Essen.

It is life or death for Germany—and Britain and France. The Governments must take thought for the morrow, and the morrow beyond the morrow. They must have iron of every grade, nickel, manganese, chrome, copper, petroleum, and also every element of explosive. They cannot have too much. They must deprive their neighbours of them. They must have works abroad to control them. Britain and Germany and France will, therefore, wrangle when Vickers and Krupp and Schneider are contending for the raw materials of industry and profit. Britain will endeavour to control arms supplies to Turkey; Germany to Belgium; Austria will supply China; Russia (France) will arm Serbia. Each will avoid the appearance of an alliance by operating through its private firms. The small nations cannot support themselves at all, the countries without manufacturing resources have to become subsidiary allies, openly or secretly—like Austria or Turkey.

That is one of the great functions of Kruppism—to serve the Governments in secret, to arm the "neutral," to prepare the way for an alliance, to check the rival, if possible—to disarm him and disorganise his industries. That is one great reason why no Government will consent to the nationalisation of the armament industry. That is one reason why the peoples of the world must wrest it from its present holders—but by no means the only reason.

How the War found Britain

THE OUTBREAK of war found the Allies in absolute potential command of the seas. The superiority of the Entente Powers was overwhelming, and, so far as Britain was concerned, the numerical advantage was not so remarkable as the qualitative lead. Ship for ship, gun for gun, in material, in strategical possibilities, in the resources of her shipyards, gun and armour works, and in expert labour and appropriate installations, Jellicoe was leagues ahead of his opponent. If the Baltic has been mainly German, the Mediterranean has been even more an Allied lake. Japan has kept the Pacific. In all waters the Germans were impotent from the outbreak of war, and for weeks before.

Extremely few people in authority in this country appear to have suspected that the great emphasis laid by German writers and propagandists on the need for increasing the Fleet, and the quiet support this view was having in official circles was not the true line of German war policy. The German militarists and their professorial apologists have been remarkably successful in arousing in the British and French nations a fear of their quite indifferent sea power. They have known how to play on the traditional susceptibilities of their western rivals in such a way as to distract them in great measure from the real course of German policy.

Not less notable has been the entire failure of our militarists, both official and extremist, to appreciate the new problems of modern warfare. A close acquaintance with the literature of the war advocates leaves one totally uninformed on the great revolutionary changes in material demand which a European war would occasion. There are endless pleas and complaints concerning the shortage of officers, the lack of staff-training and the inadequacy of our armies. These were the occasion of agitation in the country and the Press, and of frequent debates in Parliament, but one searches in vain for any recognition of the utter unpreparedness of our War Department to munition the forces it would require in any European campaign. Everywhere one encounters the stock argument of a reactionary military caste, evidently thinking still

in the terms of its Victorian experience, but utterly without enlightenment on the accomplished marriage of science and war.

Could anything be more futile than to pursue and, with the utmost vehemence, to recommend a foreign policy which must inevitably entangle the nation in the complications of Continental war, and take no steps to provide, on an adequate scale, those contributions which this country can always best make to a confederacy, and which constitute her greatest worth as an ally?

Yet this war found Britain without any system whereby all her incomparable engineering resources could be instantly mobilised for the supply of munitions, not merely on sea, but also on land. It was not so much that her supplies of small arms and munitions, of field artillery and machine-guns, of all kinds of specialised military accessories were negligible, but that next to nothing had been done to provide for such an emergency. Men rushed to the recruiting offices, and the brigades and divisions spread out in scores of training areas, but there was no instant re-direction of manufacturing enterprise to cope with the demand. The machines were lacking or not co-ordinated; the great supply trades were not in intimate touch; central control and sympathetic understanding between manufacture and army contract departments had to grow up during months of critical struggle.

The marked success which attended the selfish capitalist interests of the armament firms during a whole generation in their unrelenting endeavour to reduce Woolwich Arsenal, to close down Sparkbrook, and to injure Enfield and Waltham Abbey, as well as to prevent the establishment of new State ordnance factories in suitable manufacturing areas, has reacted ruinously on the cause of Britain and her Allies.

The *Murray Commission on Government Factories* (1905-1907) reported :—

> . . . The trade takes time to adapt itself to an increased demand, and the Arsenal must be adequately equipped for tiding over the first few months of a critical period. After that period, all-important as it is in war, private enterprise may be trusted to meet the national requirements to a large extent. (p. 8.)

Not only had the Arsenal staff been reduced and kept to a level nearly five thousand below what the Chief Superintendent declared to be necessary; not only had vital improvements not been undertaken, but the Arsenal was not even put to work at full pressure. After nine months of war the writer discovered, and drew Mr. Snowden's attention to the disgraceful state of affairs in the gun-shops, and had the matter aired in Parliament. At that time not one-tenth of the field guns were being made at the Arsenal, and one firm that had never made them before had 50 per cent. more on hand than the State workshop, where men were not kept fully

employed. The great private firms were late with deliveries, and it was mainly through them, acting as middlemen, that other engineering firms were getting work. The Arsenal was not adequate to its demands; it was dependent, utterly, on outside undertakings, and these were building up their organisation as the war went on. Slowly, and with infinite waste and loss of energy, the industrial system was mobilised in this country.

The invasion of Belgium and of Northern France deprived the Allies in a month of the mighty metallurgical resources of those invaluable areas and added them to the wealth of the enemy. Liège, Maubeuge, and other centres of small arms manufacture, were lost to the Allies, and France was shorn of 70 per cent. of her steel production.

In the Crimean War Britain had bought arms in Liège; in the French wars her agents had bought up stocks in Germany and elsewhere on the Continent. Once again, hostilities found our War Office without small arms or the means to turn them out with rapidity.

The lessons of the wars of William III., the Spanish Succession, the Revolution in '93, the Napoleonic War of 1805, and of the Crimea, had been entirely forgotten. Once again our militarists had leaped into war half-armed, and once again they had to purchase their necessaries from neutrals.

Compulsionists, conscriptionists, militarist extremists of every school must stand here in the pillory with those whom they have persistently criticised. Incompetence and reaction were again the handmaidens of our diplomacy, and to-day Britain and her Allies are paying, and new generations yet unborn will continue to pay, the price.

There are two countries in the world with a great machine-tool industry suitable and adapted to the requirements of land armament, land transport and electro-chemistry—Germany and the United States.

Russia was very speedily cut off from the sources whence she might renew with ease the machine requirements of her arms factories. Her almost complete dependence on Germany and the closing of the Black Sea route to imports soon disabled her manufactures and put a high premium on all her orders.

Britain, France, and Italy inundated America with contracts for material and machinery. As in 1854-55, Britain, and as in 1870-71, France, went to New England for rifles, quick-firing guns, ammunition, and the means to make them. In their necessity they turned to America *per* Morgan, Grenfell and Co., and so put themselves deeply into the clutches of a financial and manufacturing group, whose one primary interest was to make as much as possible out of the war. So, to-day, American capitalism strains every nerve to supply the Entente with arms, and, at the

same time, uses its monopoly power and the needs of its clients to ensure the passage of cotton and rubber and fats and other raw materials to neutrals contiguous with Germany. As the *Westminster Gazette* recognises—

> We cannot push controversy with the United States to the point of imperilling the munition supplies without jeopardising military interests of great importance to our Allies as well as ourselves.

The Allies positively dare not use the power of their fleets lest the United States discover a crisis in Mexico and requisition the armament factories of the country for national purposes, so, automatically, prohibiting export of arms to Europe.

The Allies must pay up and look as cheerful as they may. Meanwhile the United States acquires an up-to-date munition plant second to none, and profits such as enable its firms to lay out shipyards and factories wherein their corporate expression, the United States Government, can have built economically the fifty giant battleships and other ships with which to challenge the Right of Search and all future blockades, at the mouths of Bethlehem guns.

To pay for American munitions the Allies must raise a loan in the United States, and, as the war continues, the indebtedness of Europe to New York will grow and the mortgage will be the exploitation of South American and Oriental markets by American capital. To make sure that these pledges shall be kept, the United States is going to construct a monster navy and equip a large army. Such is the heritage of expansion and muddle which our diplomats and militarists have prepared for their children.

How the War found Germany

THE GERMAN GOVERNMENT appears to have had a very much clearer grasp of the realities of modern warfare than any of its antagonists, and to have decided on and vigorously pursued an all-round policy of offensive-defensive. Fully realising that it was unwelcome to its established sister empires, Imperial Germany has faced the perils of its situation and countered them in the most ruthlessly practical manner.

In Europe, Germany was bound to excite the increasing hostility of France and Russia, whilst an extra European policy of expansion would bring her into conflict with Britain and the United States. Whichever way she turned she must find enemies and, as time went on, she found them ringing her around with diplomatic understandings, alliances, armies, and fleets. Her allies, Austria-Hungary and Turkey, and, later, Bulgaria, were empires that were in decline and peril, or had failed to make good. All of them were economically weak and under the sway of monarchist and military cliques. Each saw the possibility of recovering prestige in such an alliance as the one Germany offered them. All of them were military states, and almost immune from naval attack.

Germany alone had a navy and a mercantile marine, and these were swept from the seas on the outbreak of war, but without crippling her strength or exposing her curiously defensive coast-line to invasion or attack. Much more self-contained in reference to foodstuffs than Britain, and more self-reliant as to raw materials than any of the Allies, Germany had no serious cause to dread the blockade. She trusted, and not in vain, to contiguous neutrals to supply her with food and other necessaries. With this end in view she had long had organised a system of provisioning by friendly agents in neighbouring countries. In this, as in almost every other detail of war administration, the minutest contingencies has been provided against in advance.

The communications over which the German and Austrian armies have been moved from front to front and from position to position with such remarkable speed and efficiency were, of course, planned out and developed by the State itself, and the arrangements for facilitating mobilisation and despatch were, from the

first, made by the military. No military State is so foolish as to tolerate private and competitive running of railways having strategic importance, and it is most probable that the changes in administration of British lines during recent years have had the marked approval of the Imperial Defence Committee, and the assistance of those on or in close touch with it. It was generally held in inner Socialist circles some time back that the Government desired to weaken the railways and transport unions owing to their fear of labour action in war, and desire to placate and humour the railway directorates.

Whilst in this country the plain evidences of the construction of strategic bases of communication are impossible to trace, there are queries which arise in our minds about the laying out of Immingham and Newhaven, two railway ports whose commercial importance scarcely seem to have justified the expenditure and effort put forth, and which, certainly, occupy sites of exceptional military value.

The Germans have, however, pursued a wonderful railway policy, under State direction at home and under private operation in the Balkans and Asia Minor. The supply of material for these great railway systems has, of course, been of the utmost importance, and has mainly devolved on private engineering and steel works.

This afforded enormous work for the iron and steel-producing syndicates which are so highly organised in Germany, and which constitute a firm foundation, on which reposes the industrial structure of the armament and machinery trades. Here, as elsewhere, the dominion of the financiers is paramount, and the great banking corporations are supreme. The same enterprises provide the materials of munitions and communications, and in the supply of railway steel they naturally found their primary and permanent strength. It is of great consequence to a military power to have closely co-ordinated and highly-developed railway contractor and constructional firms which can follow up behind the armies and maintain those services by which alone the provisions for millions of men can be transported. German railways have been of the utmost importance in contributing to the efficiency of German armies. But railways, nowadays, have been supplemented by other transport facilities on a prodigious scale, to wit: motor carriage and the supply columns of modern field forces rely primarily on petrol-driven vehicles. Here there are several great concerns contributing to the war machine, the chief of which are: Daimler Motorenfabrik, Maschinenfabrik Augsburg-Nurnburg, and Brown-Boveri, of Baden.

All these three undertakings come within the orbit of the Löwe "Gruppe." Dr. Walther Rathenau is a director of Brown-Boveri, and the Daimler is a mere daughter company of that Löwe con-

cern of which Rathenau, Paul von Gontard and other armament and machinery magnates are the controllers. The Augsburg-Nurnburg, reputed to be a "rival" of Krupp, comes under Siemens-Schuckert influences, shares at least one magnate with the Deutsche Waffenfabrik, and is indirectly related both to Krupp and the A.E.G.

The all-important subsidiary supplies of rubber and petroleum are looked to by the Löwe banks, which "are more influenced by the great acts of industrial combination than *vice versa.*"

Rubber brings us naturally to the bewildering maze of interests grouped around the Allgemeine Elekritäats Gesellschaft (A.E.G.) and Siemens-Schuckhert. Much has been written (an infinite selection of fable and fancy) about Krupp and the cannon-kingdom of Essen, but the mightiest figure in German war industry is Dr. Walther Rathenau, of the A.E.G.—the man who was entrusted at the beginning of the war with the mobilisation of German industry. As he was already in his capacity of banker, electric king, machine tool maker, steel manufacturer and chemical producer, at the centre of an all-powerful national and international octopus, his work cannot have been difficult of accomplishment.

He was involved in the Berliner Handelsgesellschaft Bank, the Mannesman Tube Co., the A.E.G., Lõwe, the Metallgesellschaft, Brown-Boveri and a host of other ventures. His colleague, Louis Hagen (by far the most influential of the German directors of the Nobel Dynamite Trust), Paul von Gontard, Kosegarten, and Ballin brought within their grasp the whole immensity of undertakings on which Kaiserism depends for its munitions.

Not Dr. Krupp von Bohlen und Halbach, the husband of Bertha, and head of the Krupp firm, and not this romantic enterprise, but Rathenau and Hagen and the "Lõwe Gruppe" constitute the central citadel of German capitalism and German militar-economic strength.

The writer has beside him lists of machine tool munition, electrical and chemical enterprises obviously dominated by these two personalities and their immediate associates. The wealth of Silesia and Westphalia; the power of the Rhineland and Saxony; the forges and machine shops of Baden, Bavaria, the Ruhr and Berlin; the shipyards of Stettin, Hamburg and Kiel; the counting houses of Cologne; the far-flung tentacles of German commercial intrigue all responded to the will of these men.

Behind them loomed the Direktion der Disconto-Gesellschaft, the Norddeutscher Bank, the Dresdner and Darmstadter Banks, the National and Deutsche Banks, Bleichroder, Levy, Oppenheim, Salomonson—all the inter-related company and private banks to which German business eventually traces back. These organised and prepared at home and organised and planned abroad.

The Metallgesellschaft controlled, so far as it could, the raw metal supplies of the German steel and metal trades, and monopolised the best material for its own people, seeking to disorganise the supplies of other nations.

The steel producers and, notably, Krupp, endeavoured to make themselves indispensable to foreign steel consumers, and so in Russia, made the war problems of Czardom more difficult of solution.

The Löwe "Gruppe" not only got ready the organisation of machine tool firms and prepared to handle at the shortest notice an immense extension of demand for rifles, ammunition, motor wagons, tools of every kind, electrical apparatus, all the necessaries of machine production, operating at a terrific pace, but actively helped to disorganise the armament manufacture of Germany's neighbours.

In Liège, Brussels, Paris, Lille, and Brescia, subsidiary companies were supplying German machines to Belgium, France, and Italy, in England and Russia, components of this group were providing the electric apparatus and machine tools so difficult to replace, except from Germany.

The same was true of their chemical associates, whilst German finance was thrusting out now here, now there, in Turkey, Bulgaria, China, and South America, the antennæ of finance hostile to the Entente Powers.

Technical skill, scientific methods, genius for organisation, unity and continuity of administration, all these helped to make ready to the hand of the German Mars, a wizard workshop of Vulcan. There, in Germany, the capitalist and militarist state was unhindered by Liberal traditions, by Conservative fears of revolutionary purpose behind the collectivist methods, for the capitalist class had sprung up after Liberalism had received its death-blow, and when Imperialism had become the settled form of government.

Harsh realism, a keener critical faculty, a far greater knowledge of history and economics, a finer appreciation of science and technology, all these explained the triumph of German system, a triumph in the face of desperate odds of which no eventual defeat can ever deprive her people.

War not the Way Out

It seems increasingly more probable that the war of armed nations is going to fulfil the prophecies of Bloch, and that on no side will there be conspicuous military successes leading to the overthrow of one of the belligerent groups. The writer will not, however, commit himself to any prophecy on this count, and prefers to adopt an agnostic attitude. For all her technical efficiency, the inventive genius of her scientists and her superb system, Germany may not be able to provide herself with all the essential raw materials, whilst her man-power can scarcely enable her to win in a long war of attrition. Against her, unless the advocates of more stringent blockade should have their way, and thus alienate from the Allies the friendship of powerful neutrals, are mobilised all the engineering resources of the Allied nations and of the United States. The productive capacity of these countries has been enormously augmented and is being taxed to its utmost extent. In a long siege war the Allies may win by sheer pressure and the exhaustion of their adversary.

The intervention of a certain neutral State would totally alter the existing conditions, and the adherence of this Power to either side would, undoubtedly, turn the scale.

What effect the enormous reduction of wealth output and the destruction of capital will have on the belligerents and neutrals it is impossible to say. The prognostications of economists were so far mistaken in their forecasts of what would happen when war came that one hesitates to anticipate the peace conditions. It is well to remember, when discounting fears of economic collapse, that whilst the Powers mobilised their finances for war, there is not so much reason to believe that they are so carefully preparing for peace. They are too busy winning the war to think of the future that lies beyond. On the other hand, the catastrophic school would do well to remember the great resistant power of society and its amazing recuperative energies. Moreover, present-day production is so great that the damage may be made good in a very short time. Chaotic individualist control will get short shrift after the war, and there will, probably, be a speedy clear up of the

appalling mess. If the war drags on for a long time something may result analogous to the state of Germany after the Thirty Years War, but one cannot imagine that Nationalism will be a flourishing growth after the frightful orgie it has stimulated, and in which it has wasted itself.

There may be a revulsion against war, and there may even be revolution as a consequence, but these eventualities are too problematical to rest any conclusions upon them.

Already the Government, and, more particularly, the representatives of finance and industry, are giving their attention to superior organisation with a view to trade warfare after the cessation of military hostilities.

State capitalism, which has enabled the Germans to do as well as they have, will almost certainly be adopted, not only in the Allied countries, but also in the United States. There will result a very much closer co-ordination of State action and private enterprise than has previously been followed here or in America.

The Germanisation of the industrial system is being advocated in many and responsible quarters. We are likely once more to have a national economic policy, and the Free Trade interlude appears drawing to a close. Tariffs are being suggested by erstwhile ardent Free Traders, and the new systematisation of national industries will go far beyond what is generally termed "Protection." The whole genius and power of the State will be focussed on the reinforcement of the capitalist system.

Even as Strafford and Colbert aimed at National Power, so will the statesmen of capitalist society seek to temper the new instrument and make it strong to do their work.

Here, in this country, the double requirements of Army and Navy will present us with a very grave problem, even should the Quadruple Entente harden into a long-date offensive and defensive alliance. Unless Germany is decisively checked in the Balkans and Asia, the defence of India and Egypt will become more pressing upon us. It is scarcely likely that our statesmen would be content to entrust the defence of these dependencies to their partners or to forces of native troops, however reliable. Nor can one credit France and Italy with entrusting to us the sole control of sea power. Financial co-operation will more easily resolve itself, for Britain and France will continue to be the lending parties, and Russia and Italy the borrowers. The military and economic future of Russia are absolutely baffling, unless Turkey can be smashed, or detached from Germany. As things were before the war, and as they would be on a present settlement, Russia seems bound to develop under the economic tutelage of Germany. She is utterly isolated by land, save over the long Siberian route, and presents only a very short strip of Lapland tundra to the ice-free seas of the winter season.

Entrenched in Belgium, the Nord, and French Lorraine, keeping a firm grasp on the invaluable iron ore and coal deposits of these regions, and holding these industrial areas to ransom, Germany has fine counters in her bargaining game. Nature has made her North Sea shores and the Balkan Peninsula invincible to naval assault.

Should Germany be able to sit tight, her prospects remain excellent. Unless some great change comes internally, we can imagine Germany entrenching herself behind miles of field fortresses and drawing cordons of these from one sea end of her frontiers to the other.

So much for Europe and the European Powers.

There remain the extra-European nations—the United States and Japan. The last-named will, probably, adhere to the Quadruple Entente, not being strong enough to stand alone in the new world of alliances. Japan may yet play a most important part in British foreign policy—a part more than welcome to herself. She will lie to the west of America, in close proximity to China.

Hitherto we have scarcely made any mention of the United States, which still remains unconcerned with the political differences of the European nations, and which has only had an indirect influence on the international affairs of the Old World. The rise of American sea power had a curious reaction upon the development of Germany. First, the constructional policy of the United States Government so fostered the weak shipbuilding industry of that country as to make it a serious rival to the new German firms for the leavings of British builders, and also to afford a striking example of the advantage to be gained by State aid to a "stagnant" industry. Finally, the victory of the United States in 1898 and the seizure of the remaining dependencies of Spain in the West and in the East ended all hopes of Germany that these might eventually revert to her and carried with this obvious success the predominance of the Western Power all over the American Continent.

The United States, now reconciled to Great Britain by the wise statesmanship of Lord Salisbury, was in a position to assert against all comers the Monroe Doctrine of non-interference in South and Central America. For the last eighteen years the United States has been steadily consolidating its position as a first-class Power. The very extent of its undeveloped tracts of land and its sparsity of population, compared with its area, have kept the American people from casting eyes on foreign shores. Self-contained economically to an unequalled degree, the United States has continued dependent in very large measure on European, and particularly British, capital.

Year by year, and without any sensationalism or recurring scares, her navy has been added to and augmented until it is now

second only to our own. The completion of the Panama Canal and its inevitable fortification have added to the mobility and also to the cares of her fleet. Whilst the Kaiser Wilhelm Canal is all German and lies within the confines of the Empire, the Panama waterway is some distance from the main territory of the Republic. It brings the Eastern seaboard ports into closer touch and better trading connection with the Pacific coastline and the Asiatic market. It discounts to a great extent the scanty manufacturing resources and harbour facilities of the Western States. Henceforth, Chili and Peru are destined to fall more and more under the influence of their mighty sister Republic, and, altogether, tendencies suggest the gradual emergence of an American Federation, wherein the political doctrine of Monroe will be supplemented by economic cohesion and the financial supremacy of the United States.

One result of the European War will, probably, be the ousting of British capital from the pre-eminence it has attained in the South American Continent. Political Monroeism will be made more real by the accession of its economic counterpart.

Brazil and Argentina are likely to contribute their raw material to the industries of the United States and to provide an outlet for the surplus products of that country, rather than of Britain.

For the last thirty years Chili, Peru, Argentina, and Brazil have had their armaments from Vickers, Armstrong Whitworth, Schneider and Krupp. New types of cruisers and the experimental models which eventuated in the battleship-cruiser and the super-Dreadnought have been evolved to gratify the petty ambitions and at the expense of these baby nations.

The Balkan game, which has so dishonoured the Powers, has not been more cynical than the conscienceless exploitation of these tiny Republics and their mutual antagonisms in the cause of naval experiment and improvement of warship design. This is not the time, and here is not the place, to unfold the records of an infamy of which the writer hopes some day to tell the story.

For the future these nations are likely to go to Pennsylvania for their equipment, to have their ships constructed by Newport News, Cramp, the New York Shipbuilding Company, and Harlan and Hollingsworth, and to order their small arms from New England and their artillery from Midvale and Bethlehem.

The third Power of the coming time will be Greater America. The longer this war continues the greater becomes the indebtedness of the Allies—the Powers with over-seas interests—to the financiers of New York. Already fabulous fortunes have been amassed out of the sale of munitions to those who could take delivery and capital has flowed steadily into the war industries. American engineers have specialised on a demand which gave them the highest return, and have provided themselves and, incidentally,

their country with an up-to-date, extensive and thoroughly efficient plant for the organisation of a gigantic home armament. A board of inventors and experts has been appointed to bring all the resources of science to the aid of military and naval defence, whereon Edison is a prominent figure. Meanwhile, the naval and military attachés in all the belligerent countries are making careful notes of what they see, and their reports are being sent in and compiled at Washington.

Scarcely less there than here, men are cudgelling their brains to add to the frightful armoury of machine and chemical slaughter, which finds so ready a sale in the European capitals. American trade and technical papers are a revelation to anyone who cares to read through their ample pages of attractively presented advertisements.

The Americans, like the Germans, have a genius for automatic machinery and small tools—it is a characteristic of industry catering for continental transport—and they have contributed extensively to the arts of mechanical homicide. We need only mention Colt, the inventor of the revolving pistol; Dr. Gatling, whose surgical mind adapted parallel rifle-barrels to a single firing mechanism, and produced the first practical machine gun; Hiram S. Maxim, whose application of rapid fire action to a Winchester barrel, gave the world the deadliest of all automatic rifles; Hotchkiss, Remington, Peabody, Gardner, Pratt and Whitney—the wizards of small arms output; John P. Holland, who from 1875 to 1902, built successive submarines until he produced Holland IX. and the brothers Wright, heroes of aviation.

In war after war, the nations have turned to America for equipment which she, with her death's harvest of the Civil War, has been well able to provide, till, now, the Engineers' War has turned all her workshops into fevered hell-pits, where the wealth of her mines and forges is wasted in capitalism's wildest orgie of Production for Profit.

The United States is acquiring the enormous machinery essential to modern militarism, and the owners thereof are already voicing their demand for national "preparedness" by land and sea and air. Already, the Peace President has made "preparedness" speeches in Pittsburg.

America must be, and will be, "prepared." Why? Because, though she may be "too proud to fight" when material interests are not at stake, her governing class will never tolerate the Right of Search on the high seas one day longer than they can help it. A nation with thousands of miles of sea-board on two oceans will never submit permanently to another Power's claim to be the Mistress of the Seas, and will, moreover, build such a navy as she considers ample for her requirements, *i.e.*, the requirements of her capitalist class. This class is now making of America a

creditor nation, which will insist on the settlement of mortgage problems after the war. The price of monetary assistance will have to be paid in the surrender of trading advantages and concessions to American capitalism. Both to ensure this and the maintenance of their hold on new markets, patriotic Americans will require the provision of adequate naval and military armaments.

Morgan, the financier, now negotiating loans and orders for the Allies, is Morgan of the American Navy League, and Morgan who stands behind the Steel Corporation, which controls Wm. Cramp, the Union Iron Works of San Francisco, and the Carnegie Steel Co. Morgan works with Schwab, of the Bethlehem Steel Works, which holds friendly converse with the New York Shipbuilding Co., the Fore River Shipbuilding Co., Harlan and Hollingsworth and Newport News.

The falling away of orders which must inevitably occur when European nations once more become self-dependent, as will happen when the war is over, will cause such a depression in the American steel trade and machine industries as to make the demands for State expenditure absolutely irresistible. No pacifist movement, and no socialist agitation will be able to stand against the adoption of methods which, whilst bringing temporary relief, will thrust the nation further and further along the disastrous way that leads to international friction.

The armament manufacturers of Europe will, once again and with increased prestige, enter into competition on the world market to challenge Bethlehem and its allies. Behind the old-world firms their governments will rally, and to the aid of the Pennsylvanian industrialists will be summoned all the support that the vigorous flaunting of "Old Glory" can arouse.

* * * *

It is a dismal prospect not made more pleasing by the enforcement of industrial conscription in Continental workshops and economic compulsion by armament contractors in this country.

. . . . . The shadow of a terrible despotism looms athwart the workshops of the world wherein the workers, bound by legal enactments, fettered by official regulations, forbidden the right to strike, deprived of their trade union rules, driven on by fears of national disaster and kept in control by military authority,

may yet become the helpless serfs of an all-powerful combination of employers, at whose head are the armament syndicates.

Such is the terror which has sprung from the dependence of the nations on private metallurgical and chemical manufacturers, whose one concern has been to extract the uttermost farthing from the governments who came to them for armaments. This is the grim tragedy which has resulted from permitting the exploitation of organised fear in the interests of the Profit-maker. It is the universal nemesis of those who have tolerated and encouraged the fatal philosophy on which Capitalism depends.