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WHEN BRITAIN GOES TO WAR

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WHEN BRITAIN GOES TO WAR

ADAPTABILITY AND MOBILITY

BY

LIDDELL HART

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TO

JOHN BUCHAN

MY FIRST GUIDE AND FRIEND

IN LITERATURE

FOREWORD

The present volume is the unforeseen outcome of the request for a new and cheaper edition of *The British Way in Warfare*. In producing this, it seemed desirable to bring the book up to date. But, setting out merely to revise the original matter, I found myself adding so much new matter that the volume threatened to exceed the size that was compatible with the purpose. While pondering this problem, I recalled a friendly criticism of the original book—that its contents did not altogether bear out the title, especially the 'British' note. Here was a guide in adjusting end and means. I decided to omit such of the old chapters as were least related to the title, and to produce a book in which the most relevant of the old should be blended with a number of new chapters—thus gaining increased unity of theme while maintaining the purposed economy of price. In its new form the book, also, gives greater proportionate space to the present and future—as the altered title may convey.

FROM THE ORIGINAL FOREWORD TO *The British Way in Warfare*

The purpose of this book is to show that there has been a distinctively British practice of war, based on experience and proved by three centuries of success. From that practice a theory should have developed naturally. But its growth was stunted by shallow thought and deformed by slavish imitation of Continental fashions. The consequences of that malformation are to be found in the years 1914–18, and have been felt ever since. The causes can be traced in the half-century, and especially the last decade, before the coming of the World War in 1914.

The historic British practice was based, above all, on mobility and surprise—apt to Britain's natural conditions and aptly used to enhance her relative strength while exploiting her opponent's weaknesses.

The book, further, forms a study of present British methods and means of war, set against a larger background and seeking a longer horizon—to foresee the probable or, at least, the reasonable trend of the future.

Any reasonable man must hope that war will have no future. But experience does not lend encouragement to the hope. And reason working on experience may even suggest a doubt whether war has not some purpose that is beyond the ambit of human reason, despite its palpable unreasonableness as a way of settling any human issue. That purpose may be as a corrective to greater evils, as a cleansing of the spirit of a people and an age from corruption. If so, it is a crude and wasteful way of cleansing, but it may be necessary in default of a better way. Reason checks the definite denial of such a purpose, while nevertheless impelling those who believe in the ascendancy of reason to strive against war along with the evils which produce war—to check the fever as well as the disease.

But for this we must understand the condition we are attempting to treat. Rational pacifism must be based on a new maxim—'if you wish for peace, understand war'. Ignorance means the disarmament of the peace-lover, rendering him impotent either to check war or to control its course. History has ample evidence of how often a move to preserve peace, or to restore it, has been paralysed by so-called 'military reasons' that were no more than a rationalization of unreasonable impulses. There lies the tragedy, a tragedy which pacifism of the proverbial ostrich variety has always invited, and still invites. Hence we need to understand not only the causes but the conduct of war. This understanding can only be attained if we study war in a purely scientific spirit, with our minds freed from any pro-military or anti-military bias which

might impair our judgment—and thereby nullify our deductions. In such a spirit war is studied in this book.

While the book comprises essays and lectures (relating to the essential theme) that have already been printed in various periodicals, many of these have been amplified or added to subsequently. But in those chapters which form a commentary on recent years, I have left the actual matter unaltered, the passage of time having brought no cause for change, although it has in some instances brought confirmation.

May I warn the reader, finally, that there is one chapter, V, which means effort in the reading. It is, for example, unsuited to quick digestion just before bed—unless perhaps it is used intentionally as a potion to induce sleep. There is much truth in the aphorism 'hard writing makes easy reading'. But not the whole truth. Hard thought is necessary to penetrate the deeper truths and to gather the full significance of any truth. The reader must give if he is to receive.

Chapter V meant hard writing; almost every sentence was gauged with extreme care. However its value may be judged, in my own judgment at least this chapter contains more pure ore—little as that may be—than any whole volume that I have written. But its value to the reader will certainly depend on him. It is not a draught of knowledge, to be swallowed. I would rather compare it to a tablet to be sucked—a means to stimulate the juices of reflection. A means to fulfil Wolseley's prescription—'So far as I know anything of the study of war, the great thing is to read a little and think a great deal—and think of it over and over again.' That is impossible with Clausewitz, for his great treatise 'On War' is spread over nine 'books', and one hundred and thirty chapters. Even if my 'treatise' should seem to some readers as hard reading as Clausewitz, its matter is at least comprised within a single chapter.

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PART ONE

CHAPTER I

THE HISTORIC STRATEGY OF BRITAIN

The substance of this chapter is not concrete but fluid. Far from offering a new doctrine, it is really a liquid solution which may cleanse old ideas that have become encrusted with convention and have ossified into dogma. We are fond of speaking of books and lectures as providing food for thought—I feel that the need to-day is for a stomach-pump.

The questions I here raise are the outcome of a study of the last war that has been proceeding side by side with an extension of one's study of other wars, of the general history of warfare. From such a study one perceives that the differences between the last war and other wars are less marked than common opinion would suggest. Its very title 'The Great War' is at least as old as the fifth century B.C., when it was given to the Graeco-Persian War. And the title as applied to the war against Napoleon lasted until the powder trail of the latest of these Great Wars was being laid. If nothing can apparently shake the egocentric habit of speaking colloquially of 1914–18 as 'The Great War', we may at least hope that it will fade from the pages of our histories before another war arrives. For the last was not even the first to be acclaimed as 'The War to End War'.

But there is a contrast, a vital contrast, between Britain's share in the last war and the rôle she has played in past wars, those wars from which emerged the British Empire.

In the last war we proclaimed our intention to fight to a finish, until the German armies were beaten to the ground and the German Emperor was lifted off the ground

—by his neck. If we did not fully maintain this intention, we at least persevered until the enemy's power of resistance was exhausted under the compound pressure of several factors, among which the historian must take account of, even if he does not allow equal weight to, military defeats, blockade, social disturbance, propaganda, and the weakening allurements of Wilson's 'Fourteen Points'.

How far we strained ourselves in achieving this collapse by exhaustion of the foe we can gauge even better, or worse, than fourteen years ago. With all too prophetic aptness it was said that in a war of attrition, that is, of the single-minded attrition preached and practised in 1914–18, there would be neither victory nor defeat, only a common loss. To-day we are suffering not only from exhaustion of the body, political and economic, but from exhaustion of the spirit. This, indeed, has been the gravest symptom, and is to be traced all too clearly in Britain's post-war history. The dual cost of the Somme and of Passchendaele, which are so often excused and even acclaimed for their coincident drain on the enemy's man-power, has been deducted from our moral power. There for a generation, if not for ever, has been sunk the faith that created the Empire. And, even if a moral recovery should come, it is almost inconceivable that we could recover the political and economic consequences of the original moral bankruptcy.

If the adoption of this fight-to-a-finish formula was the hall-mark of the last war, its visible embodiment was our vast citizen army. For the first time in our history we poured the nation into the army. Here was the great cleavage between this and our past wars. We are apt to take for granted its necessity. But it is worth while to ask if it was a necessity.

Did Germany any more clearly than Napoleon single us out as the main enemy? Was she any more set on crushing us than Bourbon France had been in the eighteenth century, or than Napoleonic France early in the nineteenth?

Was there any leader in modern Germany who had so free a hand to achieve this aim as Napoleon had enjoyed? Was there anyone who could so completely bend the resources of the nation and the will of a united people towards his purpose of overthrowing England? We scan the horizon immediately behind us and fail to see any individual foe so formidable or with such unquestioned control of the national will and effort. But we do perceive that in the last war there was a new relation with our allies. We were tied to them both in policy and strategy as never before. We became one with them and subordinated our policy to theirs. Some would say that we were not even co-equal partners with them, save in so far as it was by the free will of our leaders that we were committed to following the dictates of a Continental strategy which drew us willy-nilly into a policy foreign to our traditions.

The mud of Flanders was symbolical. In past wars we had put our foot in it—physically. Before the last war even began we had again put our foot in it—this time metaphorically and mentally. And, during the war, we threw our whole body into it. The immediate chain of causation is to be traced through Sir Henry Wilson's pre-war affiliations; Lord Kitchener's summons to arms, the General Staff's haste to reach France, and General Joffre's haste to reach Germany, to its ultimate destination in the swamps of Passchendaele. Thither we guided and there we spent the strength of England, pouring it out with whole-hearted abandon on the soil of our allies.

It was heroic, but was it necessary? It was magnificent, but was it war? A supplementary yet separate question is whether it even benefited our allies in the long run. Did we, more pertinently, sacrifice our security, our mortgage on the future, for a gesture? Was there adequate reason why we should have changed our traditional policy, a policy that has had a longer run on the world's stage than any other, and a uniquely successful run? Why did we

change it? These are questions that deserve consideration and demand reflection.

I can find in the conditions of the war no satisfying explanation of our change. We have usually had allies, and rarely such strong allies. We have usually been regarded by our opponents as the main enemy, the central prop of the alliance opposed to them. We were still, when the last war began, the strongest commercial and financial power, and thus fitted to serve as the economic pivot of the alliance. We were still an island; air development had not yet imperilled the unique advantage of our insular security. We still had the strongest Navy, providing us with a shield and the alliance with a saw—a fleet is not fitted to be a sword. Many of our wars have found us in a precarious state in regard to our Navy, our economic strength and our allies. Rarely have we been so favourably placed as when we entered on the last war—as none have left us so unfavourably placed when we ended it. In past wars our enemy has often lain opposite our ports and on the flanks of our trade routes. In the last war we lay like a gigantic breakwater across the enemy's seaward approaches.

In reviewing these conditions no fundamental cause for a change of historic policy seems to appear. Hence one is inclined to find it in a change of fashion—in the military mode of thought inspired by Clausewitz. That we adopted it is only too clear from an analysis of our pre-war military textbooks, of the strategical memoranda drawn up by the General Staff at home and in France during the war, and of the diaries and memoirs of the dominant military authorities published since the war. They are full of tags that can be traced to Clausewitz, if often exaggerated in transfer. We seem to have adopted this mode without asking whetner it suited our complexion. It is an ironical if perhaps natural coincidence that in borrowing our military headgear from Germany we should also have borrowed its contents.

I have not met many who have read, let alone digested, the complete works of Clausewitz. Their ponderous bulk and philosophic profundity have hindered their assimilation—but without impairing their influence. The general tenor of his teaching riveted the attention of the nineteenth-century soldiers, to the disregard of his qualifying undertones. Just as he became the accepted interpreter of Napoleon, so he in turn was followed by a school of interpreters, who tended to amplify his more extreme notes. Thus what in his teaching was an undue emphasis became through them a distortion. We can see this very markedly in comparing his writings with those of Foch, who took his basic theory almost straight from Clausewitz, while carrying it to a more extreme pitch. It was left to Foch's pupils to carry it to a fantastic extreme. Because Foch did so much to mould the strategic thought of France before the war—and, by consequence the strategy of England in the war—it may be illuminating to examine his interpretation of Clausewitz.

THE MISINTERPRETATION OF NAPOLEON

The three dominant theories in Clausewitz, and in Foch, are (1) the theory of 'absolute' warfare; the corollary of which was 'the nation in arms'; (2) the theory that you must concentrate against the main enemy, who must be overthrown first; and (3) the theory that the armed forces form the true objective, and battle the true means to it. Both Clausewitz and Foch cited Napoleon and Napoleonic Warfare in support, the main support, of their theories. I propose to examine these theories briefly, by cross-examination of their principal witness.

In advocating the principle of unlimited violence, Clausewitz asserted that 'he who uses force unsparingly and regardless of bloodshed must gain his object, if his adversary does not do the like', and implied that limitation was due to 'a feeling of humanity, the worst of all

errors'. It is curious that he here failed to consider that it might be due to political acumen based on wise self-interest. He ascribed the victories of the French Revolution to the fact that it 'had thrown the whole weight of the people and all its forces into the scale'. 'Paying little heed to the calculations of political alliances . . . a calculation which weakened the force of the State and subordinated the brutal element of fighting to the reserves of diplomacy, the French Army swept through the countries' of Europe. Foch in turn ascribed the defeat of France in 1870 to its neglect of the theory 'of absolute war which Napoleon taught Europe'. 'To a people in arms, organized for conquest, invasion, a fight to a finish', France had opposed an army that did not embrace its whole manhood and an idea of war based on limited, or 'diplomatic' objects. In the eyes of Foch, as of Europe, the war of 1870 seemed to establish Clausewitz's theory beyond doubt.

But did it? Has there ever been such a thing as absolute war since nations ceased to exterminate or enslave the defeated? Nineteenth-century Europe has passed beyond the Mongol stage. If the term 'absolute war' has any meaning it is that of a fight until the capacity of one side for further resistance is exhausted. In practice, this may well mean that its conqueror is on the verge of exhaustion, too weak to reap the harvest of his victory. In other words, absolute war is a war in which the conductor does not know when to stop. It implies that the end is pursued regardless of what lies beyond. The conductor allows the fighting instinct to usurp control of his reason. If this be the logical definition of absolute war we may perhaps view St. Helena as the proof that Napoleon was its prophet. And to-day also we know where it has led us. But it is certain that Bismarck did not share it in 1870, whatever the delusions his successors derived from a victory that was quick and cheap. His principle, like that of the statesmen who built the British Empire, was to make war with profit and make peace when a war ceased to promise profit.

Next we turn to the theory of striking at the main enemy first and directly. Two phrases of Napoleon's have been repeatedly cited in support of it. 'Austria is the main enemy; Austria crushed, Spain and Italy fall of themselves. We must not disperse but concentrate our attacks.' 'I see only one thing, the mass; I try to destroy it, feeling sure the accessories will fall of themselves.' Both phrases take on an entirely different aspect if we trouble to discover the circumstances in which they were delivered. The first, moreover, has been mutilated. It was part of an appreciation made by Napoleon two years before his first campaign of 1796. After saying that Austria was the main enemy he actually added—'it is thus necessary that as far as possible our action should strike directly *or indirectly* at this power'. He did not propose to strike at it direct. 'In order to deal with Austria, we must crush Piedmont, a small State with no strong national feeling. . . . Austria must then bring troops from the Rhine to defend herself in Italy and our army of the Rhine will be able to take advantage of the weakening of the Austrian Army that confronts it.' This programme he carried out triumphantly two years later. His reason for deprecating a move against Spain was not merely that it was remote but that it was too formidable. He added that the move against Piedmont would 'have an influence on Poland and encourage the Sultan of Turkey'. Thus Napoleon's calculations were the very reverse of the simple-minded military aim which Clausewitz and Foch ascribed to him.

Whatever be one's views of the Balkan projects of 1915 one cannot help being struck by the astonishing parallel between them and Napoleon's plan for 1796. One wonders that none of their advocates realized the opportunity of quoting it to demolish the Napoleon-cum-Clausewitz tags that were so often quoted against them.

Equally significant is the way Napoleon actually conducted his offensive in Italy, where he was faced with both the Piedmontese Army and a stronger Austrian

Army. Carnot, who was the real creator of the doctrine of striking at the main enemy, urged that the French should march directly towards Milan and the Austrian Army. Napoleon flatly disagreed. Instead, he preferred to strike at the joint between the two armies, frighten the Austrians into paralysis, and then turn and knock out the Piedmontese Army, the weaker partner. The result perfectly justified his calculation.

The second phrase must also be judged in the light of the circumstances of its origin. It was uttered in 1797—to the Austrian generals with whom he was negotiating an armistice. They were scarcely the people to whom he would reveal his real thoughts! The glib phrase was spoken at the end of the campaign in which he had, first, overthrown Austria's weaker partner; then enticed successive parts of the Austrian Army to his chosen ground in Italy; and, in each successive phase, had concentrated against a fraction of each part. Napoleon's aim had naturally been to 'destroy the mass', but his method had been to destroy it piecemeal, beginning with the weaker parts—the 'accessories'. He only told his opponents the obvious conclusion, not how he had beaten them.

This campaign also affords us evidence in examining the third theory of the alleged expositors of Napoleon. Clausewitz, with that tendency to dramatic generalization which obscured his many discerning reflections, declared that while 'there are many ways of achieving the political object of war, the only means of achieving it is by combat, and everything is subject to a supreme law, which is the *decision by arms*'. The distinction between ways and means was too subtle. Clausewitz appreciated that the theoretical ideal of a decisive battle, cancelling everything else, must be subordinated to the question whether such a way was practicable and profitable. But his followers thought only of the ideal and caught hold of such phrases as 'Battles are the deciding factors, all other activities being merely its appendages'. Thus Foch, quot-

ing Clausewitz, exaggerated and narrowed his meaning—'No strategy can henceforth prevail over that which aims at securing tactical results, victory by fighting.' Instead of seeing tactics as one of the tools of strategy, he made strategy merely a conduit pipe to tactics. 'Strategy does not exist by itself, tactical results are everything.' 'Modern war knows but one argument: the tactical fact, battle.' 'Battle is the only *argument* in war, therefore the only end that must be given to strategical operations.'

Hence Foch held up to derision the generals of the eighteenth century. He took a remark of Marshal Saxe, 'I am not in favour of giving battle, especially at the outset of a war', and contrasted it with Napoleon's remark to Soult at the beginning of the 1806 campaign—'There is nothing I desire so much as a great battle.' Foch's scornful comment was—'The one wants to avoid battle his whole life; the other demands it at the first opportunity.'

Once more, both remarks are distorted by ignoring their circumstances. Saxe had actually added—'I would not be understood to say that an opportunity of bringing on a general action, in which you have all imaginable reason to expect victory, ought to be neglected; but only to imply that it is possible to make war without trusting anything to chance, which is the highest point of skill and perfection within the province of a general.' Saxe was a connoisseur of the art of war, and in setting forth his ideal was obviously employing hyperbole. His own record comprised several great battles, all victories. The exact measure of his thought was to be found, rather, in his warning—'decline the attack altogether unless you can make it with the advantage'. We are aware that his warning was not heeded by the generals bred in the nineteenth-century school of war.

Similarly, the significance of Napoleon's remark depends on the time of its utterance. In 1806 he had 'all imaginable reason to expect victory'. He desired battle because the opportunity was ripe. If there was a difference be-

tween Saxe's outlook and Napoleon's later outlook, with results that can be seen in the history of France, there was not the complete contrast that Foch implies. Like most of his contemporaries, Foch swung in reaction from an extreme which Saxe had never reached, to an extreme which Napoleon had never contemplated.

One cause seems to have been that they concentrated their study of military history on the details of Napoleon's and Moltke's campaigns without a broad historical background and without attention to any of the Great Captains before Napoleon, the very sources which Napoleon had recommended for study.

With curious aptness did Foch compare his own recommended form of study to the use of a microscope. It is even more curious how it misled him in the very campaign he chose for study. For as Professor Spenser Wilkinson has remarked in his latest book—'The striking feature of the campaign of 1796 is the absence of anything that could be called a general engagement.' Napoleon, the man who is exalted as having made strategy merely a route to battle, thus actually achieved what is by general recognition his unsurpassed masterpiece of 1796, by pure strategy, without a battle. By skilful threat and mobility he nullified the need for battle, so showing that Saxe's ideal could be realized. It is significant that he himself confessed at St. Helena that although he had subsequently fought sixty battles they had not advanced his knowledge of war beyond that of his opening campaign.

Again, let us cross-examine our witness as to the higher strategic aims which governed his later campaigns. Austria out of the war, England became in Napoleon's eyes the main enemy. The French Government was preparing to invade England. Did Napoleon agree with the practicability of this direct military attack? Far from it, he proposed two alternatives—in a remarkable letter of February 1798. One was a conquest of the German coast in order to cut off British commerce from central Europe. The

other was an expedition to the Orient, also with the idea of ruining British trade. Thus both, be it noted, were inspired by the idea of economic pressure.

As the first was then within reach by diplomatic action alone, the second was adopted as the line of military action. Instead of the romantic irrelevance that it has been sometimes pictured, it was a shrewd calculation, based on the facts that the British Fleet had abandoned the Mediterranean since 1796 and had been disorganized by two serious mutinies. That Napoleon was ultimately foiled in his eastern plan by England's sea-power does not affect the question of what he thought was the most hopeful way—the indirect way—of striking the main enemy. And only by mischance was he foiled—because his own Government failed to make an adequate diversion towards Ireland and because the British Government were thereby emboldened to send a fleet to the Mediterranean, overriding the opinion of the Sea Lords. In this case, the Cabinet had a firmer grasp of strategy than the Admiralty, and, by another stroke of ill fortune for Napoleon, they found a uniquely brilliant agent—Nelson—for its execution.

It is significant, again, that Napoleon returned to this idea when he became First Consul and that Malta, the key to Egypt, was the immediate cause of the war that began afresh in 1803. It is doubtful how far his great invasion plans were serious, how far they were not merely a means of distraction. Yet his objective was Britain—or, rather, Greater Britain. The true grand strategy of Napoleon cannot be better expressed than in the words of the late Sir John Seeley, the famous Regius Professor of Modern History at Cambridge.

'He is the Titan whose dream it is to restore that Greater France which had fallen in the struggles of the eighteenth century, and to overthrow that Greater Britain which had been established on its ruins. He makes no secret of this ambition, nor does he ever renounce it. His conquests in

Europe are made, as it were, accidentally, and he treats them always as a starting point for a new attack on England. He conquers Germany, but why? Because Austria and Russia, subsidized by England, march against him while he is brooding at Boulogne over the conquest of England. When Germany is conquered, what is his first thought? That now he has a new weapon against England, since he can impose the Continental System upon all Europe. Does he occupy Spain and Portugal? It is because they are maritime countries with fleets and colonies that can be used against England. Lastly, when you study such an enterprise as the Russian expedition, you are forced to admit, either that it had no object, or that it was directed against England. But this view escapes most historians—because their outlook was obscured by Europe, and the obvious conquest of Europe by Napoleon.

One might add that this view has escaped most military writers both because their outlook has been obscured by Europe and because they have overestimated the attraction of battle for Napoleon. But it is more astonishing that it should have escaped students of war in this country.

When Austria was the main enemy Napoleon struck first at her weaker partner and then in the direction where she could oppose him least effectively. When Britain was the main enemy he did likewise. In either case he led through weakness to strength. Any other strategy is merely to play into the opponent's hand. Against Austria he employed military action, as there was little scope for economic pressure. Against Britain he employed economic pressure, as there was little scope for military action. Recognition of his plan's real aim by no means implies admiration for the manner in which he carried it out. But the fact of underlying significance is that in each case his approach to the main enemy was essentially indirect.

Britain foiled him as she had always foiled her main enemies—becoming Ever-Greater Britain in the process—

by a grand strategy that, similarly, was indirect although it took a different form. Our traditional form—suited to our national conditions.

BRITAIN'S PAST STRATEGY

I propose, briefly, to examine this traditional grand strategy from the time when the discovery of the New World shifted the economic, and in consequence the political, axis of Europe westwards to the Atlantic coastline. As a result this island was shifted, geographically, from the circumference to the centre. The change gave this nation the opportunity of self-conversion from the status of an 'outsider', economically and socially backward, to the dignity of a seat in the European 'Inner circle'.

Characteristically, perhaps, we were slow to seize the opportunity. The cynic might say that Henry VII was too preoccupied in economy campaigns, Henry VIII too busy in the divorce court. It would be more profoundly true to say that they were consolidating the foundations upon which Empire-building could begin. The immediate consequence was that a Greater Spain and a Greater Portugal arose a century before we took up the idea of a Greater Britain, although English sailors were actually ahead of Columbus in reaching the American continent. Even Holland, though it did not gain its own independence until the end of the sixteenth century, was so quick off the mark as to beat us for third place.

Our awakening in the Elizabethan age was economic in origin. We discovered the profit of becoming an unlimited company of state-protected pirates. Economic motives led us to exchange our old habit of military aggression for a new one of naval aggression. And when we developed this into colonization, the creation of a Greater Britain, we succeeded in overtaking and overcoming our rivals because we alone steered clear of the delusive attraction of 'Continental victories'. But not of war. We cannot burke the fact that it was through war our profits came, through

war our capital grew. The process began when Elizabethan business men invested their capital in expeditions that were little different from piracy; and although the process later assumed a national complexion, the economic foundation could have no more apt illustration than the fact that it was under the name of a Company that we gained our Indian Empire.

While the impulse to 'get rich quickly' inspired many who supported the expeditions to the Spanish Main, these had the deeper purpose of breaking Spain's economic monopoly in the New World, and thereby led to open war. The removal of the veil of nominal peace thus gave to the sea campaign an air of respectability. Spain's reply took the form of direct attack—by invasion. If religious fervour played its part, the decisive urge came from a double danger. First, the English attack on Spain's trade with the New World; second, English support to her revolting Dutch provinces.

In the struggle, sea mobility was pitted against land strength. The gigantic shadow of the Armada is apt to obscure this fact. The Armada was used merely as a means of enabling Parma's veteran army, the supreme army of the time, to cross from the Spanish Netherlands. Its transports were waiting at Nieuport and Dunkirk. How did England counter the danger? Drake, Hawkins, and Frobisher—the most experienced 'warriors'—advocated a strategy in which concentration should be subordinated to mobility and surprise. Drake's raid of 1587 on Cadiz had not only set back the Armada a year but had done permanent injury to its morale. Now, in March 1588, Drake urged that 'with fifty sail of shipping we shall do more good upon their own [the Spanish] coast than a great many more will do here at home; and the sooner we are gone, the better we shall be able to impeach them'. But Elizabeth came out as the upholder of safe concentration and of a direct answer to the attack. Eventually Drake and his fellows persuaded the Lord High Admiral,

Howard, who magnanimously said 'I confess my error'. And Howard's authority overbore Elizabeth's scruples.

But time had been lost that was not regainable. The Armada was on its way, while Howard and Drake were blown back by a gale before reaching the Spanish coast. Thereby the Armada had the advantage when it entered the English Channel. But by worrying tactics the English regained it, morally first. The ruseful use of fireships at night against the Armada's anchorage near Calais completed a moral disintegration and caused a physical dispersal that, when followed up by attack in the morning, proved decisive.

But although indirect tactics had foiled the menacing power of Spain, indirect grand strategy might have broken it if pressure had been applied less spasmodically. Spain's military power was based on the economic resources of her New World possessions. The treasure fleets were her vital artery.

This was realized by the naval writer, Sir William Monson, who had served as a junior officer against the Armada. But its application was left to Cromwell and his 'amphibious' general, Blake. Cromwell had been attracted by the dream of Continental victories, with more justification perhaps than anyone since, but he did not let it warp his judgment. A practical commercial outlook guided him even in his negotiations towards a great Protestant league. And the war with Spain was the outcome of Spain's embargo on English shipping.

What form did Cromwell's action take? He certainly sent a small expeditionary force to the Continent, having made an offensive alliance with France. But this was to be used not against Spain directly but to strike at her root in Flanders. Here he combined two, indeed three, aims. He wished to deprive Charles II, then in Flanders with the nucleus of a Royalist army, of a base of invasion; to gain permanent possession of Dunkirk, as a safeguard to his control of the Channel; and he also shrewdly cal-

culated that it would provide him with a lever to exert future pressure on his temporary ally. The joint army, which fulfilled its object, was put under a French Commander-in-Chief, Turenne. It is interesting, incidentally, to recall that his headquarters were at Montreuil, the site of the British Headquarters on the next occasion when the forces of France and Britain fought side by side in Flanders.

But this Continental expedition was a secondary operation. Cromwell's main line of action was to send Blake's fleet to cruise off the Spanish coast and intercept the silver ships from America. He even thought of seizing Gibraltar, arguing that it would 'enable us, without keeping so great a fleet on that coast, with six nimble frigates lodged there to do the Spaniards more harm than by a fleet and ease our own charge'. For lack of a landing force the idea was not fulfilled. But in September 1656 a treasure fleet was intercepted off Cadiz and five out of eight ships, with £2,600,000 worth of silver, were sunk or captured. The following April, Blake intercepted a larger treasure fleet of sixteen ships, sailed into the harbour of Santa Cruz in Teneriffe, where it had taken refuge, and destroyed the whole fleet without losing one of his own. The effect was far more decisive than any of the bloody victories which we love to celebrate, Blake's death from the fatigue of the long blockade no whit less noble than Nelson's at Trafalgar. Strange is our sense of historical proportion.

For, as Admiral Richmond has pointed out—'Spain's finances were crippled, her military operations were thereby stopped. Unable to pay her armies, the invasion of Portugal came to a standstill, and Portugal was saved on the brink of disaster. Spanish power in Europe was struck at its very roots.' One should add that the successful break-away of Portugal from its sixty years' union, which had undermined its own commercial strength, was fatal to that of Spain. In Sir John Seeley's words—'Spain fell never to rise again, and no measure taken by England had for centuries been so momentous'.

One should add that Blake's indirect action had also a second indirect purpose. For his cruise up and down the Spanish coast was intended to prevent not only silver ships coming in but reinforcements going out to Spain's West Indian Colonies, whither Cromwell had sent an expedition. Jamaica was the fruit we plucked.

In the ruin of Spain's power, Cromwell completed what the Dutch had begun. From her eighty years' struggle for independence Holland emerged not merely in a state of independence but as one of the great States of Europe. Her greatness lay in the fact that she had become Greater Holland, with a world-wide chain of colonies. This was due to the indirect form of her grand strategy. While on land she was content to stand on the defensive, varied by occasional ripostes, she took full advantage of the opportunities which war afforded to attack the overseas possessions of Spain and Portugal. By stripping her enemy of these she redressed the uneven fortune of the war on land, weakened her enemy's power to sustain the war on land, and came out of the war as much enriched as her enemy was impoverished.

But her success brought her into trade rivalry with England. And she was drawn into a fresh series of wars, into a struggle for economic supremacy before she had time to consolidate her new estate. In this struggle, moreover, England had the geographical advantage of position —direct and indirect. While she lay like a breakwater across Holland's sea inlets, Holland had an exposed land frontier. It is significant that English grand strategy embraced no direct attack on Holland, and equally so that the Dutch was no longer able to develop its former indirectness.

The first war, 1652–54, under Cromwell's direction, began on the English side with a purely indirect attack —on the Dutch convoys and herring fisheries. The Dutch, feeling the pinch, resorted to a direct naval attack, and a series of battles followed in which the advantage eventu-

ally inclined to the English. But it was their continuous trade losses which mainly drove the Dutch to seek a peace advantageous to England.

The next war, under Charles II, was again naval and similarly began with a purely indirect attack, initiated by England and imitated by Holland. Once more Holland converted it into a war of direct naval attack and, although the issue of battle finally turned against England, she could console herself for the burning of Chatham dockyard with the permanent acquisition of New York, gained in the first phase and kept at the peace.

In the third war, 1672–74, Charles II found a Continental ally, France, and so could benefit by his opponent's handicap of a land frontier, while limiting his own expenditure of force. This was also limited by his own people, who disliked the war, and eventually compelled him to withdraw from it. Yet it was England who drew the ultimate profit, extending her colonies and her trade, whereas Holland, although checking the land invasion and successful in her sea actions, was irreparably exhausted by the double strain. From this point her decline began.

Paradoxically, it was to be confirmed by a reshuffle which made England her partner. Her ruler, William of Orange, on gaining the English throne, drew a reluctant England into the Grand Alliance created to combat the growing power of France. The issue was to be as fortunate for England as it was unfortunate for Holland, in the long run. The energy of Holland was diverted into the channel of 'Continental victories', and her strength suffered by the strain. In contrast, England, while participating in these with limited expenditure, was able to reap the fullest profit by indirect economic pressure. She succeeded because her main enemy, Louis XIV, made 'Continental victories' his main aim.

The curtain now rose on the third, the last and longest, act of the great drama produced by Columbus. A Greater Britain faced a Greater France, the creation of Colbert.

In this conflict, the military assets were on the side of France. But geography gave Britain a natural asset, and her grand strategy created a mental asset.

In the first scene, the war of 1689–97, she failed to use it, for William III was obsessed with the Continent and concentrated his resources on direct military action. The war was notably indecisive, and unprofitably expensive to this country. The change came in the second scene, when Marlborough succeeded William as stage manager.

The war of the Spanish Succession has been aptly termed 'the most businesslike of all our wars'. The glamour of Marlborough's victories on the Continent has tended to obscure this fact, as well as the vital part played by our sea mobility both in undermining the enemy's military power and in picking up permanent assets. When the war began, France was the first State in the world. When it ended, Britain had succeeded to this proud place at a comparatively trivial expenditure that yielded a magnificent dividend. In the main theatre on land she invested a very limited force, although multiplying it by the unlimited genius of Marlborough. It is significant that, in contrast to the British strategists of 1914–18, Marlborough encouraged every distant diversion which might react not only on France herself but on her Spanish partner. By our purposeful dispersion a dispersion of the enemy was created which we turned to advantage.

In the winter of 1703–04, the use of the Anglo-Dutch Fleet for strong naval demonstrations led to the severance of Savoy and Portugal from the Franco-Spanish partnership. In August 1704, the enemy's distraction was exploited by the capture of Gibraltar at the price of a mere 300 casualties. This success had more effect, immediate and permanent, than the victory of Blenheim the day before. For Gibraltar, a greater than Gallipoli, was not only the permanent key to the Mediterranean; in this war its possession by the British henceforth pinned down a large Franco-Spanish land force; furthermore, it split the

naval force of France, locking up a third of her strength in the Mediterranean.

This achievement was followed up by a land expedition which won the whole of eastern Spain and then, if less wisely, penetrated to Madrid. It is interesting to note how even bad execution failed to mar the effect of good grand strategy. Marlborough profited by the diversion to clear most of Spanish Flanders, while the accession of Savoy to the Grand Alliance led to the French retiring in that theatre to their own border. The consequence was that in 1706 Louis XIV sued for peace on terms more favourable than those eventually won. He offered to give up his grandson's rights not only to Spain itself but to her New World possessions. The allies, however, had not learnt when to stop.

In 1707 Marlborough conceived a new indirect move, an amphibious stroke at Toulon, which he calculated would draw off all the French troops from Spain and thus enable this prop of French power to be definitely knocked away. Through bad execution on the spot the goal was narrowly missed, but the attempt put such fear into the French that they sank most of their fleet at its anchorage. Marlborough, moreover, was quick to devise an alternative stroke, the capture of Minorca, with the idea of gaining a base in the Mediterranean which would enable the Allied fleet to keep guard over Toulon and safeguard his land diversions in Italy and Spain. In his judgment, the fall of Minorca in 1708 was more important than the coincident fall of Lille.

The true intent of Marlborough's strategy, often missed, was even more in what he planned than in what he did. Far from wishing to pursue the direct advance on France in 1706 he had proposed to move his army to Italy. Again, in 1708, he proposed to slip down the coast, leaving the fortress barrier in his rear and, in conjunction with an expedition from the Isle of Wight, reach Abbeville, in rear of the French armies. Both these plans had to be

forgone because his partners had no stomach for the calculated daring and originality of his strategy.

At the end of 1708 Louis XIV once more sued for peace, and it is clear this time that his yielding was due far more to economic pressure than to military action. While the battle of Oudenarde made no decisive change in the military situation, the grip of sea-power on French trade and on imports of food had reduced France to a state of grave distress. It is significant that Marlborough favoured acceptance of Louis's proposals, which Britain's partners and her politicians rejected, so deluded were they by the mirage of absolute victory in the field. It is equally significant that when the war was resumed he thought of continuing it by sea-pressure alone.

But the mirage had too strong an attraction. And its consequences were far reaching. The French were driven to a military effort of desperation. Marlborough was drawn into his costliest battle, Malplaquet, and from nominal defeat the French recovered their morale. Henceforth the Allied prospects steadily contracted, while the growing success of the French was only limited by the past strain on their resources. They even won the last battle, the great victory of Denain, and yet, because of exhaustion, lost the peace. If they retained part of what they had originally been willing to surrender, Britain not only kept Gibraltar and Minorca but was ceded Nova Scotia, Newfoundland and Hudson Bay. More immediately profitable, she broke the Spanish trade monopoly in South America, being given the lucrative if disreputable right of slave-supply.

Britain might have gained still more from the war if she had pursued her own grand strategy more strictly. And she might have ended it sooner. For the maintenance of the French and Spanish armies depended on the supplies of bullion that came from Spanish America. Admiral Wager's solitary interception of one treasure squadron in 1708 did much to paralyse Spain's military effort and to

cancel the battle of Almanza, preventing the Franco-Spanish army from following up its defeat of the Allies. It helps us to gauge what might have happened if a strategy of sustained interception, the cheapest force of action, had been applied. Perhaps it needed a Cromwell —still better, a Cromwell bred at sea.

The interest of the war of 1739–48 lies in the power of our traditional grand strategy to survive even the grossest mismanagement and to counterbalance even the worst chain of blunders. We began by attacking Spain indirectly through her trade source of strength, but when France entered the arena we relaxed this effort in favour of the use of sea-power as an auxiliary to the army. Our strategy was a compromise between direct military action on the Continent and colonial expeditions, and itself was compromised by the rusted state of the instrument. The more weight we threw into the Continental struggle the less effect we achieved, but when in 1746 we again sent a large fleet to the Mediterranean it hamstrung the French invasion of Italy. Moreover, when in the last phase of the war we renewed our indirect sea-pressure in the West Indies, it paralysed the enemy's trade. Our sea-power, in fact, nullified the military successes of Marshal Saxe in Belgium, as well as those of Dupleix in India, and compelled the French to accept a negative peace, a peace of mutual restitution.

The issue thus postponed was to be settled in the Seven Years War, which saw the triumph of Greater Britain over Greater France, and established us in a position of economic supremacy that no subsequent failures could shake. The war began badly with the loss of Minorca, and with menacing defeats in America and India. But then Pitt took charge, resharpened the military instrument, and vigorously carried out a grand strategy that became the purest example of our traditional form. Direct military effort on the Continent was largely replaced by subsidy to our allies. Meantime, under cover

of direct sea-pressure on France, indirect military action was applied to the overseas roots of French power. When peace came in 1763 we had possession, cheaply won, of Canada, all the French West Indies, Bengal and all the French settlements in India, Senegal in Africa, Belle-Ile off Brittany, as well as Havana and Manilla taken from Spain. That Britain restored some of these conquests in the peace treaty was not because of necessity but because Pitt had been forced out of office by George III's jealousy. And the possible criticism of Pitt's policy of empire-building as 'jerrybuilding' does not affect the wisdom of his grand strategy in war.

In the American War of Independence our 'deep-land' strategy, committing land forces far into the interior, led to the disastrous surrender of Burgoyne's army at Saratoga, and this in turn to the entry of France and Spain into the war against us. Our entanglement prompted them to regain their lost colonial empires, and our own was more gravely imperilled than ever in its history. In the crisis Amherst, the chief military adviser of the Government, argued that 'the future operations must be principally naval, to distress their trade and prevent their supplies from Europe', supplemented by a series of amphibious 'attacks on every part of the American coast that is assailable'. So long and so far as it was strictly carried out, this limited strategy against the American colonies, coupled with a defensive attitude towards our European foes, paid well. Only when Cornwallis was emboldened by success to extend its limits and launch a campaign of interior conquest, did the scales turn against us. And this reverse was immediately due to the temporary loss of our sea superiority. When this was restored by Rodney's success in the West Indies, economic pressure had so impoverished the Americans that they jumped at the chance of making a separate peace, which gave us the chance to make a comparatively easy settlement with our European enemies. We had lost the American colonies,

but we had preserved the Empire. If we had from the start put the money into naval force that we wasted on Continental effort—in America—we might have saved all.

The struggle against Revolutionary France and against Napoleon saw a renewal, and a renewed success, of our traditional grand strategy. This was applied by sea pressure on the enemy, by financial support to all possible allies. And no turn of ill fortune induced us to deviate from it towards a larger military effort. It was by lending sovereigns to Sovereigns that we chiefly fought France on land.

At the outset we did, indeed, send an expeditionary force to Flanders. Its defeat was perhaps a blessing in disguise. For thereafter we eschewed the main theatre of war and employed our land forces for sea-based operations against the enemy's vulnerable extremities. Having made a collection of the French colonies, we ousted the French from Egypt and then used our army to aggravate the local centres of anti-French infection in Italy, Portugal and Spain. The 'Spanish ulcer' poisoned the whole Napoleonic system, undoing all the victories achieved by Napoleon in the main theatre of war. Wellington's presence was of essential service—in extension of our sea-power—towards inflaming the ulcer and checking Napoleon's remedial measures. Wellington's actual battles played but a small and infrequent part in the process. His passive resistance in the lines of Torres Vedras did more damage than any, whereas his subsequent victories were of hindrance as well as help. They drew the French towards him and thereby gave the Spanish guerrillas a chance to tighten their grip in other parts. But his victories of 1812 led the French to contract their zone, this concentration in the north revived their power of resistance, and the struggle thereby became a gradual clearance instead of the more sudden and complete collapse which might have come if they had stayed in occupation of the whole country.

The war ended, Napoleon abdicated, without a British army setting foot in the main theatre of war. It is true that in 1815, after Napoleon's escape from Elba, we sent a contingent; but we easily forget that it formed barely one-twentieth of the Allied force assembling in the theatre of war, and barely one-seventh even of the actual force that took part in the Waterloo campaign.

A romantic habit has led us to hide, and has even hidden from us, our essentially businesslike tradition in the conduct of war. For this power of self-deception we paid heavily a century later. For a true view of our past might have counteracted the unbusinesslike allurements of the Continental theory. Our historic practice, as we have seen, was based on economic pressure exercised through sea-power. This naval body had two arms; one financial, which embraced the subsidizing and military provisioning of allies; the other military, which embraced sea-borne expeditions against the enemy's vulnerable extremities. By our practice we safeguarded ourselves where we were weakest, and exerted our strength where the enemy was weakest.

I can see no convincing reason why we should have abandoned this practice, proved by three centuries' experience of warfare.

To some, what I have said may sound like heresy. It is certainly a repudiation of the doctrine of strategy accepted on the Continent. And if one reads the writings of our ruling military leaders in 1914–18, one finds that they denounced as heresy arguments that were but a pale shadow of those contained in this chapter. Yet in the light of Britain's history who were the real heretics, the violators of tradition? Has any other theory than the one we have here traced the historic title to be called 'British Strategy'?

In 1914–18 we fulfilled it in the naval and economic sphere, but in the military sphere we changed it for a revolutionary innovation, raising a huge army and employing

the bulk of it for direct action in the main theatre of war. The cost is known, the benefit doubtful. And although this immediate military pressure certainly contributed to the enemy's eventual capitulation, as all pressure contributes, the neutral or impartial historian is coming more and more to the conclusion that our blockade was the more decisive factor. While only the historian has opportunity for detailed study of the question, a simple test is possible for anyone who travels in Germany and is on terms of intimacy with some of its people. For if anyone still doubts that it was the blockade which made a continuance of the struggle impossible, they will surely change their opinion when they realize the rations on which the German armies tried to live in 1918, the still worse hunger which the people at home suffered, the effect of that suffering on the spirit of the people and its inevitable reaction on the will of the men who were fighting.

THE LOST CHORD

I will end with a speculation as to what might have happened if we had adhered to our historic theory. While it in no way affects that theory, embedded in our past history, and is too late unfortunately to relieve our recent history, such speculation may serve to point the application of that theory, itself as enduring as conditions are changing.

The original expeditionary force might still have been sent to France, in which case it would have played the rôle it did until the Battle of the Marne was past. Alternatively, it might have been sent to the Belgian coast—as its commander himself suggested. In this case, from what we know now of the German plan and the German command's frame of mind, there is strong reason to believe that it would have dislocated the whole German plan against France. Dislocation would have been the more probable because of the rigidity of this plan. And the deduction is strengthened because we know what effect a

mere brigade of Marines at Ostend and a Belgian sortie from Antwerp had upon the German command. How much more effective, too, would have been the Belgian Army if fortified by the presence of the British Expeditionary Force.

But in any case, once the original invasion had been stopped, our historic theory indicates that our military effort would have been shifted elsewhere. Even if the bulk of our original expeditionary force had not been moved, the divisions subsequently available would have gone. Here one would remark that we might have raised Kitchener's 'First Hundred Thousand', but certainly not his 'Last', still less should we have adopted conscription. Instead we should have developed our industrial capacity for supplying and munitioning our allies.

The shifting of our military effort to the Near East might or might not have availed to prevent Turkey joining the enemy powers. Assuming that it did not, the facts of the situation as revealed in the official history of the Gallipoli campaign seem to provide ample assurance that the Dardanelles could have been opened by a force equal to Kitchener's original estimate—150,000 men. Thereby the channel of munition supply to Russia would have been opened—to the almost certain prevention of her defeat. The Balkan States, even if they had not rallied to our side on the arrival of our army in the Aegean, would now almost certainly have come in. Their ardour would have been stimulated and their military strength increased by liberal and timely subsidies. The move up the Danube as advocated by Galliéni would now have been possible, obviating or rendering subsidiary the more restricted line from Salonika through Uskub. Serbia would not merely have been saved, but turned into a spearhead. In the light of 1918 we are able to gauge the effect of this compound menace and pressure on the ill-knit Austrian Empire, ripe for disintegration. Italy's entry would certainly have been hastened and her penetrative power sharpened.

It will be asked—what of France and Germany in the meantime? France would have been compelled to remain on the defensive, much to her own and the general benefit. In the light of 1916 there is surely no reason to doubt her capacity to hold her existing line in the West—although by historical precedent even a failure to do so would not have been irretrievable. She would probably have been prevented from squandering her strength in those futile offensives of 1915, which irreparably damaged her army, and would have been able to take the offensive more promisingly as soon as there were signs of a loosening of the enemy grip. One may add that, if Britain's adherence to her traditional strategy had been clear in the prologue to the war, there is some likelihood that France would not have rushed to the attack in August 1914. And if she had stood on the defensive originally there is scarcely a doubt that the original offensive would have been foiled.

Germany would naturally have been quick to reply to a threat along the Danube line, although she could not have interfered with the earlier attack on Turkey. But the more troops she diverted to the Danube front, the more chance for France and Russia to exert effective pressure. For France would have spent fewer men and Russia would have possessed more munitions. Moreover, only a large diversion of German forces could have sufficed to withstand the compound strength of the Allied advance on Austria's weakest side, a side that geographically did not lend itself to defence.

The most remarkable 'blind spot' in the strategy of the Allies was the failure to perceive the importance of Serbia as an irritation, and consequent distraction, to their main enemy at a most sensitive spot. Even those who demur to the idea of shipping large forces to the Balkans can hardly justify this omission, or the strategy that prevailed—if reason and experience be any guide. For without distraction elsewhere, concentration in the West could not reasonably be expected to have effect. A menace to uneasy Austria's

rear would have been an invaluable distraction to the forces and plans of the Austro-German allies—strategically Siamese twins. It was, indeed, a necessity if Serbia's allies were to concentrate with effective results in the main theatres. Geography made the Balkans a potential 'Austrian ulcer'. To sustain the irritation, quality rather than quantity of reinforcement was needed—a Wellingtonian stiffening of purpose, organization, and equipment such as Western resources might provide.

It is not necessary to envisage a sudden collapse of the Central Powers. Strategically they would have been in a situation similar to that of late October 1918, but without the open side then existing on the north. So closely ringed round, economic pressure would have been felt the sooner, and would not have been alleviated by the new sources of supply that they tapped as a result of their 1915–17 conquests in the Balkans and in the Ukraine.

Let us, however, assume that this many-sided advance, with more allies against fewer enemies, led merely to a stalemate. Even in that improbability, fidelity to our tradition instead of to Clausewitz would have led us to negotiate for peace—the usual ending of the wars from which we have benefited most. Into the negotiations we should have entered with our usual bargaining counters, and from them at least have emerged with strength less impaired than to-day.

Victory, in the true sense, surely implies that one is better off after the war than if one had not made war. Victory, in this sense, is only possible if the result is quickly gained or the effort economically proportioned to the national resources. Favoured by geography, it has been Britain's distinction to excel in this wise economy of force. In a far-sighted fulfilment of the principle, looking beyond war to peace, lay the secret of her unbroken prosperity during three centuries. In fulfilling it she relied principally on economic pressure, the most economical form of pres-

sure. In the last war the conditions of industrial civilization had made her enemy more susceptible to economic pressure than in the past. And because of geography her navy was better able to apply it. Yet for the first time in her history she made it a subsidiary weapon, and grasped the glittering sword of Continental manufacture.

CHAPTER II

WAR IN THE AIR

The war clouds seem to be gathering again over Europe. If a large part of the English people are still sublimely unconcerned, a sensitive observer cannot travel on the Continent without becoming conscious of the tenseness in the atmosphere. And as he thinks of the future his eyes instinctively turn upward—to the sky. Little imagination is needed to fill it with fleets of aircraft raining their bomb-loads earthward.

Tennyson's 'airy navies grappling in the central blue' was good anticipation—up to a point. It missed the point that every modern military air test tends to establish: that in the three-dimensional warfare of the air it is very difficult to bring an opposing air fleet to battle, while very easy for aircraft to slip past the enemy's shield and strike straight at his heart.

Grasping this point, the thoughtful public in Europe apprehensively pictures another war as a process of launching vast aerial armadas at the enemy's cities. It sees the war of the future as purely a war in the air, in which the civilian populations will serve as massed targets for the contending champions.

The reaction to this fear is seen in the great attention, rapidly developing these last few years, to civilian safeguards against air attack. In all the chief countries of Europe elaborate schemes of warning and protection have been worked out, and are being practised in public demonstrations. Scarcely a month passes without news of some such spectacular test.

One that took place recently in Warsaw is typical. For

the best part of a day the Polish capital was converted into 'a city of the dead', its uncanny silence broken only by the noise of protective measures, and its streets peopled only by duty-bound spectres in gas masks. In the morning the alarm was given by the sudden strident clamour of sirens, motor horns, and gongs. A fleet of air bombers swept over the city and, where their bombs were supposed to have fallen, smoke and tear-gas bombs were exploded —with unpleasant results for people who had no gas masks. Then fire engines and anti-gas detachments raced to the scene, while yellow-badged volunteers were treated as gas casualties and rushed off to hospital. So were casual civilians who had failed to play the game and take refuge. The staffs of Government offices and business houses sat for hours in special shelters or cellars, and the whole life of Warsaw was compulsorily dislocated. When a fresh attack came in the evening all lights were extinguished and the electric current cut off.

Similar trials have been carried out in French, German, Italian and Russian cities. Some of them have not been so drastic, but others have been harder to bear—in Vilna a number of people and animals were injured by the flour-bags used to represent bombs.

The organization of the nation for such 'passive' defence has been in progress in France since 1931. Marshal Pétain, Commander-in-Chief of the French Army in the war, was entrusted with the task. All municipal authorities and factory-managers have had detailed instructions as to their rôle in emergency, and the defence arrangements for each town and village are dovetailed into a nation-wide scheme.

Similar schemes, which include the widespread building of bomb-proof and gas-proof shelters, are being swiftly elaborated in Germany under the energetic impulse of the Nazi Government. There, the tests carried out at Munich and elsewhere have a further purpose—to remind the people constantly of the need for an air force and to align

them behind the Government in demanding armament equality.

In Italy, responsibility for the protection of the people has been vested in the Ministry of War, which has prepared its scheme of defence in co-operation with the Red Cross and public health organizations. The scheme has been tested in dramatic practices, devised to impress the danger. In April 1933 a measure was promulgated governing the issue of gas masks to the people in war time. In Spain decrees have also been issued, but there is little evidence that they are being put into effect!

But nowhere is there greater talk and activity than in Russia. Here governmental measures are ardently backed by the 'Osoviakhim', with its twelve million membership. This vast society combines the two aims of developing a greater air fleet and preparing the population to safeguard itself against hostile air fleets. One of the most significant steps is the use of alarm periods in different factory areas, so that, by frequent practice, the workers may acquire the habit of taking safety measures with the minimum interruption of output. How important this is, one may realize by recalling the great reduction of output that occurred in Rhineland and Yorkshire factories during the weeks when air raids took place, or were merely threatened.

Particular measures for the protection of industrial areas have more immediate importance than the general protection of the population. For the factories that furnish the means of war lie in more immediate danger.

If the mind of Europe is turning ever more to the air, its fears are certainly inflated by a quantity of 'hot air'. So far as the civilian masses are concerned, their present danger is undoubtedly being exaggerated. The reason is simply explained: the air forces of Europe to-day are not large enough to carry out the universal devastation that is popularly imagined.

It seems a fairly safe calculation that the tonnage of high-explosive bombs required to destroy any large city

far exceeds the capacity of any country's existing bombers. As for attack with gas bombs, this most popular bogy would seem to have still less substance when examined. For it requires a greater tonnage to produce deadly concentrations of gas, and it is easier to frustrate by organized safeguards of a passive kind. Provided that the civil population are adequately instructed, take shelter indoors, or, better still, are provided with gas masks, the danger may be reduced to proportions that make such attack scarcely worth the effort in comparison with other uses of air-power.

By contrast, the air forces of to-day are probably large enough to cripple the war organization of an opposing country, its munition sources and other means of waging war. That potentially decisive effect depends, as I see it, on two conditions—*how far the air force is intelligently used, and how far the enemy country offers convenient and sensitive targets.* Quality of direction and vulnerability will form the two main factors on which the scales of future war will turn.

Let us imagine that 'Redland' has 1,000 military aeroplanes predominantly designed and used for a policy of bombing the 'sources' of military power, whilst the targets in its own territory are difficult of access or well dispersed. And let us credit 'Blueland' with 2,000 aeroplanes, but add that it treats them primarily as auxiliaries to the sea and land forces, and that its 'sources' are clustered near the frontier. Then, of the two, I should prefer to back the chances of 'Redland'.

This imaginary case may not have an exact parallel in Europe to-day, but some of its aspects are reflected in the situation of several countries.

Ever since the war France has possessed—on paper—by far the greatest air strength. To-day, it has 1,650 first-line machines—half as many as when the war ended in 1918. In contrast, Italy's total is just over 1,050. And Britain, which was about level with France at the end of the war, has now only 880 first-line machines. Yet, in

technical reality, the discrepancy is nothing like so great as the figures imply. Both Italy and Britain have had an advantage of *quality* which went far to alter the *quantitative* balance. The progress of air equipment, as also of ideas on air strategy, in these two countries has undoubtedly benefited from the establishment of separate Air Ministries freed from the conventions and conservatism of the older services. The air chiefs in both countries are imbued with the idea that the most effective use of air-power is against the 'sources' of military power.

The British Air Force is especially strong on the defensive side. The Hawker 'Fury', developed for the interception of hostile bombers, has a speed of over 200 m.p.h., and a new 'Super-Fury' is said to attain over 250 m.p.h. For offence, the British tendency is to rely mainly on light and fast two-seater day bombers, carrying about a quarter of a ton of bombs. The Hawker 'Hart', which has a speed of 180 m.p.h., was until recently capable of outstripping any of the interception machines! With slight modification it has been adopted as a 'general purpose' machine; such adaptability suits the British Air Force, which is more immediately concerned with policing the savage frontiers of Empire than with the prospect of a European war.

The Italian Air Force has a different outlook. Under Balbo's energetic impulsion, and with Mussolini's strong backing, its main effort has been devoted to building up a massive bombing force. And of this a high proportion —about 250—consist of large bombers capable of long-range flights. Because of her immensely long coastline a considerable part of Italy's bombing force is composed of flying boats. The Savoias S55, which flew the Atlantic under Balbo's command, can each carry a bomb-load of about a ton to a range of over 300 miles, and at a remarkable speed. One may add that in the Caproni 905B Italy possesses an aerial mammoth that can carry 12 tons' weight of bombs.

Nevertheless, it would seem true to say that the great renaissance of Italian air power attained its peak both in quantity and quality three or four years ago, and that since then there has been a lull. The amount of money that Italy can afford to lay out on either experiment or equipment is not large, and for the moment her attention seems to be given mainly to improving her ground organization.

It is now the turn of France to have an air renaissance. This seems to have been the result of the creation of a separate Air Ministry, followed, late in 1933, by the formation of an Air Force separate from the Army and Navy. France has at last come into line with her neighbours—including Germany, for one of the earliest steps of the Nazi Government was to form an independent Air Ministry under General Goering. France has much leeway to catch up. Under the old military régime technical progress was poor and re-equipment slow, so that a large proportion of her machines are almost obsolete. But since the appointment of M. Cot as Air Minister, and under his successor, General Denain, there has been a great burst of activity. Many new types of machines are now being tried out.

The passage of Balbo's transatlantic squadron across Alsace brought an unpleasant shock to the French. For they found that their existing Nieuport pursuit machines could not even keep up with the heavy Italian flying boats. Now, however, the French have produced a number of new pursuit machines, fitted with the supercharged Hispano-Suiza engines. The speed and rate of climb of the Dewoitine has led French observers to claim that it is the best pursuit machine in the world. New flying boats and large bombers of from twelve to twenty-four tons' weight are also being built. The four-engined Lioré bombers are said to carry a ton of bombs with a 600-mile radius of action. In contrast to the British, the French have tended to continue the 1918 fashion of relying on

giant night bombers rather than nimble day bombers. They have, however, developed a number of fast multi-seater pursuit machines such as the Breguet and the Amiot, which look like flying battleships compared with the ordinary pursuit machine. These multi-seaters were originally intended to escort bombing squadrons, but they are now regarded as potential bombers for daylight raids—their radius is about 600 miles.

How far the French will obtain full value from their new equipment may depend on how far they shake off the grip of the old strategic and tactical doctrine, imposed during the years of army control, by which the air force was treated strictly as the handmaiden to the army. The power of such a doctrine to hamper air action and reduce the danger to another country is shown in the fact that the largest German air raid on London in 1918 was made by 33 machines, although nearly 2,000 first-line machines were employed with the army.

Whatever France may do, it is not likely that Germany will repeat such a mistake. Under enforced abstinence from military aviation, Germany has grown more intensely air-minded than any other country. And in her development of civil aviation one can easily perceive a recognition of the value of what are potentially high-speed and long-range bombers. In particular, the production of the Heinkel 70 has caused alarm in France. This machine, nominally commercial but easily convertible to military use, could carry a ton of bombs over long distances at an average speed of about 220 m.p.h. It recently flew from Berlin to Seville, far in the south of Spain, in eight hours! At the moment it could easily outstrip any of the French pursuit machines. Another formidable machine is the four-engined Junkers G.38. On the German airways it carries 34 passengers. But the Japanese have adopted it as one of their new types of military aircraft! Again, some of the new German 'sports models' for private owners would serve as pursuit machines of high efficiency.

From all indications, the German aircraft industry is admirably up to date in the design of high-performance military aircraft. And there is no reason to think that German pilots are inexperienced in the military handling of such machines. In the past, Treaty difficulties were evaded by establishing a tactical training school for German pilots on Russian territory. Once the Nazi régime was established, there was no serious difficulty in transferring such training to German aerodromes. And it has become clear that a vast reserve of volunteer pilots and mechanics is being rapidly formed. At the moment, Germany may not be able to count on more than a thousand effective military aircraft, but the total is likely to be much increased a year hence.

There are, however, powerful counterbalances on Germany's northern frontier. In the last few years Poland has developed an air force of high quality. Most of her machines are foreign type built under licence in Poland, but she has a promising infant air industry of her own: it has produced a high-wing monoplane which compares favourably with any other pursuit machine in the world. Moreover, as a safeguard, Poland is creating an exceptionally large war reserve of aircraft held in store to make up wastage. While her first-line machines number only some 400, she is said to have about another 1,200 in store.

On her northern border, however, lies the real 'dark horse' of modern military aviation. Russia to-day is probably ahead of France in quantity of first-line machines and numerically has the most powerful among the world's air forces. And, according to the reports of recent observers, a large proportion of her machines are up-to-date types of high efficiency—particularly the large bombers and the fast two-seater day bombers. Russia has as little faith as Italy in the air defensive, and thus has rather neglected to develop pursuit machines. She believes in the efficiency of a bombing armada, and because of her geographical distances has concentrated on exception-

ally long-range machines. Her aircraft industry has been equipped on a vast scale, and with the most modern machinery. Most significant of all, Russia is now said to be producing a large number of good mechanics. M. Cot seems to have been particularly impressed by the progress Russia has made towards solving this problem—long deemed her inherent handicap. And there is equal importance in the new view of future warfare which is growing up in Russia.

For in surveying the military air strength of the European nations, one should take account not only of their respective power but of their national vulnerability—weighing the one against the other. That vulnerability depends partly on geography and the distribution of industry. But it also depends on a factor that has till now been overlooked—the scale of their armies.

When we consider the intricate mobilization arrangements of a modern 'horde army', with all its interlocking cogs, we should be able to realize the ease with which it can be thrown out of gear—before it has begun to move. Even if we allow for the customary misuse of any new weapon, and also make a heavy discount from the claims made for the accuracy of air bombing, it remains difficult to see how an army of one or two million men on foot could get under way and make a time-table advance like that of the Germans in 1914.

For the air forces will be ready to strike in the first hour of the war, while the armies require two or three weeks to mobilize and concentrate. If military authorities confine the new air weapon to military uses, they will at least ensure the paralysis of the armies and the premature decease of the military plans. If a wider outlook prevails and the air attack is directed at 'basic' targets—munition factories, power centres, ports, aerodromes—the power to make war may be crippled at its source.

We still think of the last war as 'the Great War'. Our sons may refer to the next war as 'the Great Chaos'.

The larger the armies that are mobilized, the more they will contribute to that chaos. The concentration of forces, according to accepted military principles, will precipitate a state of rapid congestion, hopeless to relieve. The overburdened arteries will give a multiplied effect to the enemy's air attacks in producing a paralytic stroke. And the effects may put an unbearable strain on the bonds of discipline. One can picture swarms of starving soldiery pouring over a countryside—their own countryside—which otherwise might have been able to live on its own local supplies until the flow of traffic was restored.

In such opening conditions of future warfare the only type of military force that may be able to operate at all would be small mechanized forces. Their most potent action will be to supplement their own air force in interrupting the enemy's 'circulation'. The 'rationalization' of industry, the increasing centralization of water, light, heat and power supplies, all tend to make dislocation easier and paralysis more sure. Within a few days of the outbreak of war the warring nations may be in the grip of a general strike far more complete than the most belligerent trade unionists have ever conceived—a super-general strike of unintended production.

The effects may not be wholly ill. By paralysing action they may give a chance for passions to cool, and for folly to be realized. If so, the restoration of peace might be purchased more cheaply by this swift internal breakdown than by the exhaustion of a four years' war of attrition like the last.

At present the nations with the biggest air forces tend to maintain the biggest armies, and, consequently, the biggest armament establishments. That fact makes them more susceptible to paralysis. In the air the offensive is as superior to the defensive as it is inferior on land. The weaker side has not only the motive but the opportunity of evading battle in the air, and striking direct at its ground targets. And the very weakness of one country

in comparison with another may, if not too pronounced, retrieve the balance of strength—by reducing the target open to the enemy.

Wise statesmen would give as much attention to reducing the target as to developing their air force. While taking account of the commercial advantages of centralizing industry and supplies, one should not lose sight of the strategic need for dispersion. With the principal war industries this is certainly a first consideration. The danger has been perceived in France, and she is already trying to encourage the dispersal of her aircraft factories, at present perilously concentrated round Paris. It is said also that arrangements have been made to switch the seat of government from Paris to Vichy, at need. But no country is so vulnerable in its 'industrial geography' as Britain, and the tendency of factories to move down from Lancashire to the London area is a matter for serious concern. Another obvious source of strategic interest is the 'Grid', by which the electricity supply of the country is centralized and made interdependent. The great switching stations, out in the open, would appear to offer a peculiarly vulnerable target. So far as one can see, *duplication* would offer the best way of reconciling the economic advantages of the Grid with national security in case of war. Alternative lines might be created as far as possible, spares of all kinds made ready, and local generating stations, instead of being closed down, should be kept on a care-and-maintenance basis, so that they could be reopened at a short notice.

Britain, however, because of her small enlisted army, is likely to escape the breaking strain that the Continental countries are at present courting with their plans for mobilizing huge conscript armies. 'Self-induced paralysis' may well prove the verdict on their folly.

If I saw a Continental power deliberately cutting down its army—its infantry horde—while developing its air force, I should become more concerned than to-day as to the

possibilities of successful aggression. For in that case an aggressor might have a prospect of procuring his opponent's paralysis while preserving his own immunity.

Germany has the opportunity of such immunity, but it is imperilled by the martial enthusiasm of the Nazi masses. Russia, who in the past has provided the supreme example of the folly of mass, may be the first to free herself from this delusion. For in case of war with Japan, Voroshilov, her present War Minister, is said to be favouring the idea of conducting it purely by air action. If so, he will have the credit of inaugurating the new era of Warfare.

CHAPTER III

SPEED IN WAR

The dramatic shrinkage of the world's spaces, changing old conceptions of distance—exemplified by flights such as the recent race from London to Melbourne—has a meaning beyond the sphere of normal aviation. It has given an electric shock to those who are still inclined to survey the problem of security through pre-war spectacles, and has powerfully reinforced the arguments of the modern school of thought.

India reached in less than twenty-four hours; Singapore, the gateway to the Far East, brought within barely forty hours of London; the coast of Australia crossed in just over two days of flying; the 11,300 miles from London to Melbourne covered in less than three. Most impressive was the passage of the American 'flying hotel' piloted by Moll and Parmentier. The performance of this fourteen-seater Douglas, run by the Dutch air lines, covering a longer distance and yet reaching Australia in two and a half days, was perhaps even more significant than the triumph of the victors.

The 'hops' of up to 2,500 miles made by the British machine, the Comet, may at present only be possible under racing conditions, through the sacrifice of useful load to range. But how long, in this era of accelerated evolution, may such a limitation endure? For, as it is, the Comet could still preserve a range of a thousand miles if it carried 1,200 pounds of mail. And missiles as well as missives can be delivered by air. The normal day bombers of the present time carry a bomb-load of 500

pounds. Double this bomb-load, ally it to a range of a thousand miles—and you can begin to estimate the menace to which the countries of Europe and Asia are now exposed.

Even if one divides the range by half—since bombers must usually return to their base unless they can fly on to land in an ally's territory or are dedicated to a deliberate sacrifice—it has a formidable span. Take a map, draw circles of 500 miles' radius from the coast or frontier aerodromes of the various countries, and of their colonies —you can measure the menace for yourself. There are not many places in the civilized world that do not lie under the shadow of the wings of the Angel of Death.

But this danger is not to be estimated merely in terms of range and bomb-load. Speed is of vital importance because it forestalls interruption by defending aircraft and baffles the defence that anti-aircraft guns may offer. When the 'Hart' day bomber was introduced into the Royal Air Force a few years back, it was faster than any of the fighters which were available for the task of intercepting it—under the handicap of climbing from the ground to meet it. Not until the 250 m.p.h. Super-Fury appeared two years ago were the prospects of interception improved—but, even then, not restored to the *status quo ante*.

For in aerial warfare an equivalent increase in speed cannot overtake the power of evasion that speed in itself confers. Unlike Fortune, increased speed is not a fickle jade, but consistently favours the assailant; a cynic might say that it has a good woman's consistent preference for bad men! Every gain in speed increases not only the attacker's security but the defender's insecurity. For the higher the speed the greater the chance of, and scope for, surprise. Speed and surprise are not merely related; they are twins.

One of the most ominous changes now in progress lies in the reconciliation of speed and size. For size spells big-

ger bomb-load, or, alternatively, longer range. The large bombers of the war were slow and clumsy machines; to diminish the risk of attack by diminutive pursuit machines, they had to confine their raids to the night. But the big machines that are being born to-day have a high performance. Many of those designed for passenger service can be easily adapted to war use.

Have we yet grasped, or even conceived, the many-sided effect on war itself when the operations of war can be carried out at 200, or even 300, miles an hour? The gulf between this and anything in past experience is so vast that the military mind, or perhaps any mind, can hardly be relied on to span it. And if it falls short, what an abyss it may fall into!

It was Colonel Lawrence (of Arabia) who remarked—'With two thousand years of examples behind us we have no excuse, when fighting, for not fighting well.' Yet the history of the last war bears overwhelming proof that this store of experience did not succeed in making us fight well in the mental sense—if too well, in the physical and moral sense. His own fame was, in part, the measure of the general failure—this solitary gleam of light in the Arabian desert might hardly have attracted notice if the murk elsewhere had not been so thick. Even so, the bankruptcy of generalship as a whole was produced by the mere ripples of impending change. Aircraft were still a novelty, and motor vehicles a rarity, when the war came. Thus, since orthodoxy was universal among the High Commands, their tacit agreement in conservatism kept the brake tightly on military evolution. Since the war, however, the control of the air arm has slipped out of their hands, while the technical progress of aircraft has gone too far, besides impressing public opinion too deeply, to hold out much promise that military conservatism can keep it within bounds.

If war comes air-power will be given ample scope. What will be the effect—not merely on the targets but on the

users? Plenty has been written about the first; little has been thought about the second.

For thousands of years, since war began, war has been waged at walking pace. Man's feet have been the basis of military movements. That statement is not affected by the fact that at an early stage in history he learned to use animals to assist his movements. Cavalry armies have been rare. Save under special conditions or during a few exceptional periods, the horse-mounted soldier and the horse-drawn vehicle have only been auxiliary limbs of the foot-marching body.

Man's means of hitting gradually developed. Very gradually, it is true—shock weapons remained predominant until the eighteenth century, and even then it is a question whether the smooth-bore musket was much superior to the long-bow in the hands of the Black Prince's archers. It was only with the nineteenth century and after the Napoleonic Wars that firearms began to transform the battlefield—through the invention, in turn, of the percussion-lock, the Minié bullet which solved the difficulty of rifling, the breech-loading system, the magazine rifle, and the machine gun. The evolution of artillery and of the artillery projectile made similar rapid strides.

Although weapons might change, walking remained constant. Even unto 1914. In the American Civil War, as in the wars in Europe that followed, the railway certainly began to play an important part, although mainly in the initial concentration of armies. Even so, few strategists perceived its indirect influence; Sherman was perhaps the most notable exception to the prevailing myopia. Armies came to depend on the railway for their maintenance without fully realizing how dependent they had become. Increased ease of supply encouraged them to swell their numbers—at the end of the railway line—without asking themselves what effect those numbers would have on their power of action.

In 1914, a century after mechanical movement had

begun, the armies marched forward on foot from the line where their initial assembly was complete.

The French trudged forward to the Belgian frontier, whereas a dozen divisions despatched by rail from the tail of their columns to support the isolated Belgians would almost certainly have sufficed to hold the Germans on the short and strong Antwerp-Namur line and have prevented them even reaching the threshold of France. The Germans, their path thus smoothed by the foe, outflanked the French on the frontier and poured triumphantly down the roads into France. Yet by the time they reached the outskirts of Paris they bore the air of a beaten army—beaten by hard marches on an empty stomach. No great battle of history saw less hard fighting than the so-called Battle of the Marne which turned the tide of the World War. General Hunger and General Exhaustion had done their work when General Joffre took his opportunity to penetrate the crack.

The German marching mass had imposed too heavy a strain on its own means of supply, which in turn were strained to breaking point by the Belgians' destruction of the bridges over the Meuse as well as by the demolitions carried out by their retreating allies. No trains could run past Liége until August 24, and then only by an awkward deviation. Even when the German marching columns had reached the Marne, the supplies of all three armies on the decisive right wing had to pass along this one half-strangled artery. The block was also the decisive factor in making it impossible for the Germans to reinforce their right wing, according to the original plan—although it would have been useless to multiply numbers unless they could have been fed. Thus we can see that in this supreme crisis of the war a handful of Belgian engineers on the Meuse counted for more than several army corps on the Marne.

These vital facts have scarcely been noticed by conventional military historians, obsessed with close combat

and intoxicated by the remote smell of blood. It is thus little wonder that their significance for the future has been missed.

Apart from a few brave *franc-tireurs*, working behind the German front without hope of quarter if caught, these demolitions were carried out before the enemy arrived. In the future they may be executed, at any moment, *behind* the advancing masses—by heavy bombs dropped from aircraft, or even by demolition detachments transported by air. The effect may be not merely embarrassing, but disastrous.

Here is one aspect of 'the new mobility'. But not the only one. For it affects every side of war. In the past, the power of movement by armies was limited strictly by leg power. Mobility varied only in degree, not in kind. Yet even a slight variation of pace often had far-reaching results; it accounts for some of the most significant changes in the course of history.

When the Macedonian phalanx met the Roman legion, weight and strength as well as reputation were on the side of the phalanx. The legion broke the phalanx because it had the mobility and the flexibility—which is simply internal mobility—to probe the weak joint in the phalanx, which was the fact that the men composing it could not face about singly and defend themselves. The legion, by contrast, was a grouping of separate maniples instead of a solid body. Moreover, the legionaries who composed the maniple fought in open order, and so could move more quickly and more nimbly. Thus while the forward maniples temporarily held the phalanx in play, the reserve maniples slipped round the phalanx and charged it in rear.

But when the legions met Hannibal, the tables were turned on them at first; they were beaten by the superior mobility which Hannibal enjoyed through the ability of his infantry to give ground without breaking and the capacity of his cavalry wings to strike the legion in rear

when it was momentarily disordered. The situation was eventually saved by Scipio's reforms; he developed the legion into a still more mobile and flexible body, and created cavalry to vie with the Carthaginians.

In the centuries that followed, the success of the legion in maintaining the Roman dominion so long against many-sided pressure owed much to the development of a network of strategic roads. Science did not enable the Romans to produce mechanical legs, but they gave their soldiers roads on which they could use their legs to the best advantage.

Then, in the Middle Ages, came the most striking of all past examples of the power of superior mobility—when the Mongol horsemen swept across Asia and Europe, overthrowing every army they met between the Yellow Sea and the Baltic. Their mobility arose from perfect assimilation to their means of movement—they were bred in the saddle and hoped to die in it—and from ability to live sparsely in order to travel light. Each trooper had spare mounts and carried his own subsistence, so that the Mongol army was unencumbered by masses of transport. The Mongols proved that lightly armed troops can beat more heavily armed ones if their mobility is sufficiently superior. Theirs was an all-cavalry army, which dispensed with the need of any infantry mass, solid and slow, as a pivot.

The story of the phalanx and legion was repeated at the dawn of modern times, when the mobile and flexible Swedish formation produced by Gustavus Adolphus overthrew the massive formation, resembling a slow-motion fortress, upon which Spain and the Empire had built their domination of Europe. Gustavus enhanced the effect of his reforms by initiating a revival of cavalry mobility, both on and off the battlefield. Cavalry, hampered by its dense formation, had sunk into the habit of trotting up to the enemy's piked array, when each rank would feebly discharge its pistols and wheel off to reload.

Gustavus reduced the depth of his cavalry to three ranks and made them charge—with shattering effect.

In the English Civil War, less than a generation later, mobility became even more the decisive factor. Cromwell's 'Ironsides' were cavalry—and the infantry scarcely counted. He put more impetus into the cavalry charge than Gustavus even had attained, and relied on it more. Moreover, he developed such a control over the speed that he could turn his cavalry from one target to another in the heat of battle. By such means he turned the scales of Marston Moor and Naseby. Then, to the tactical mobility with which he won these battles, he added a strategic mobility so high that his 'crowning mercy', the Worcester campaign of 1651, was virtually decided by sheer speed of movement before battle was joined. Faced with the difficulty of direct attack on the Scottish royal army on its own ground, he deliberately opened to it a path into England. He gave it a start down the West Coast and then moved down the East Coast, sending his cavalry ahead under Lambert. Covering 200 miles in ten days over bad roads, Lambert headed off the Scots by the time they were half-way to London, and shepherded them into the bag at Worcester, which was drawn tight as soon as Cromwell came up.

The startling success of the armies of the French Revolution, and of Napoleon's subsequently, was still more a triumph of superior mobility. The revolutionary troops were too ardent and undrilled to conform to the orthodox slow step, and the quick step became normal for marching and fighting—a sacrifice of solidity and symmetry to speed. The quickened rate of movement enabled the French to outmanœuvre their opponents on the battlefield, and for their reinforcements to appear on the battlefield when their opponents assumed them to be miles away. The Revolutionary armies suffered another disadvantage which increased their advantage. Their chaotic supply system compelled them to spread

widely over the countryside in order to find food—which the other armies obtained from a complex system of magazines and cumbrous supply trains. The French forces were thus scattered in what seemed reckless style—in the young Napoleon Bonaparte's first campaign his army of less than 50,000 men were spread over as much as 100 miles of front. The fact lulled his opponents into a false security. Such dispersion mattered little when the French troops could concentrate at any point with what seemed incredible swiftness. The weakness became a strength—through the power of surprise it conferred.

Half a century later, the American Civil War taught a fresh lesson in mobility—that was not learnt. The lesson was the more significant because this conflict became the first modern war. One might say that it opened in the old era and ended in the new. It was marked by the appearance of a new power of strategic mobility—due to the railway. The effect, however, was to reduce mobility rather than increase it. The railway fostered the expansion of armies—it could forward more men, and feed them, than could fight effectively. It fostered their wants, and they became tied to the end of the railway line.

Another significant symptom of the American Civil War was the decline of tactical mobility—due to the development of firearms. The advance on the battlefield in face of fire became terribly difficult, and the opposing sides sank into trenches. Immobility became a normal state as the war went on. The Northern armies, being accustomed to better feeding, were more subject to paralysis than their rivals. In the West, especially, the dangers of a railway-fed mass were exposed by the mobile raids of Forrest and Morgan. It was a faint foreshadowing of what may happen in the future to mass armies whose communications can be reached by aircraft, airborne engineers, or tanks. Eventually the North found in Sherman a strategist who diagnosed these symptoms more clearly

than any of his time or since. The enemy had struck at him through his railways; he would strike at them through theirs, while immunizing himself. Science had not yet provided any alternative mechanized means of movement to the railway, so he found a solution in reviving the old mobility. To move fast, he saw, troops must move light—freed from fixed lines of supply and from their own desire for encumbering comforts. Having cut down his impedimenta to the minimum, he cut loose from his railway communications—to march through Georgia and the Carolinas, cutting the lines which fed the main Confederate army and wrecking its supply system at the source. The effect was dramatic and decisive.

But the portents of this war were missed in Europe. Filled with dreams of Napoleonic victories, the General Staffs did not perceive that the importance of economic factors was growing with the industrialization of nations. More strangely still, while concerned above all with battle, they did not realize the increasing difficulty of winning a battle in face of modern fire. Certainly they talked much of mobility—never more so than in the days before 1914. But they thought of it mainly as a means of coming to grips with the enemy quickly. They multiplied their masses to overthrow the enemy in this clash, but did not pause to reflect on the difficulties of keeping them supplied without losing the power of manœuvre. Still less attention did they pay to the tactical problem of covering the last few hundred yards. They tended to picture the attack as a glorious headlong rush.

When the war came, it was the problem of that last few hundred yards that beat them. And in the rare instances when they overcame it, or found a way round, their hopes were bankrupted by the difficulty of maintaining on the move the masses they were trying to move —as in the German advance of 1914. Mobility soon crystallized into immobility, along the entrenched fronts.

Their disregard of the foundations of sustained mobility could not have been more clearly shown than by the solution they long persisted in trying—that of ever more voluminous artillery bombardments. For although this storm of shells might crush the defenders, it broke up the ground so thoroughly as to check continued advance and block pursuit.

At last, more effective means of overcoming the defence were found, in tanks, gas, and the chance cloak of fog. Even then, the problem of continuous advance was never solved before the war ended—mainly through exhaustion. In the last phase the difficulty of supply across the devastated areas became a greater obstacle than German resistance. And after the Armistice, the Allied armies were forced to pause before a fraction of them could advance, unopposed, into Germany.

Are we wiser now? Have we any clearer understanding of the question of mobility?

The past year has certainly heard more talk of mobility. The armies are beginning to develop mechanized means of movement—for cavalry, artillery, engineers, and partly for the infantry, while increasing the speed of their tanks. They have been quicker still in dreaming of mobile warfare and treating trench warfare as a bad dream of the past. Are they justified? After their recent army manœuvres, the Italian authorities are said to have declared that trench warfare was 'obsolete'. And, according to reports from Washington, the American Chief-of-Staff expressed agreement with this view, adding that modern developments 'presaged rapidly moving action in the battles of the future'. The Italians, still more explicitly, asserted that 'the first onslaught of tanks and fast-moving troop detachments would break through trench lines, force fighting out into the open and make movement so rapid that nothing would be gained by digging new trenches'.

Inasmuch as I have been a prophet of mechanization

for years and have so often proclaimed the power of tanks to resurrect mobility, it may seem strange that I should demur to some extent when the highest official authorities come to accept these ideas. If I feel a doubt, it is because I do not see the means to mobility in any army at present. The overwhelming bulk of any army is still composed of infantry, and armoured vehicles are no more than a trimming. Every army will be so much afraid of its opponent's tanks that, so long as they are a small fraction, each army will concentrate its efforts on frustrating and, if possible, destroying those of the other. These efforts will probably succeed. If war comes within the next decade, the likelihood will be the greater because the generals, having been bred among horses and not among machines, may mishandle the machines they possess.

So far as recent developments in equipment have gone, the armies are becoming motorized but not bullet-proof. They have far more mobility—until they meet opposition. To retain mobility when one comes under fire one needs armoured mobility.

Contrary to the prevailing military belief, I think that the motorization of armies is more likely to strengthen the defensive than to revive the power of the offensive; that it may hasten a renewed stalemate rather than restore the open warfare for which every keen soldier ardently longs. For motors are, above all, a means of bringing small arms, of which the chief is the machine gun, rapidly to the scene of action—and it has been the machine gun which has created the modern superiority of the defensive.

If a motorized army is opposed to a semi-civilized army dependent on animal transport and short of modern weapons, the former may obtain speedily decisive results. But where two civilized armies are matched, motorization will assist the resistance of the weaker by enabling it to switch its machine guns quickly to any point threatened by the enemy's advance. And there, stalemate will set

in unless the attacker has a means of crossing the bullet-swept zone. Infantry may be able to do so under cover of night, smoke, or gas. And tankmen can do so under cover of armour. But it is not enough to break into an enemy's position; for decisive results, one must break right through and maintain the momentum of the advance. Here is the snag: a few stray machine gunners may suffice to bring unarmoured troops to a halt. The best hope of rapid progress lies in armoured vehicles, if there are enough of them. No army as yet has enough to warrant much hope.

There is, however, an alternative possibility. If mechanized troops cannot make a way through, they may find a way round—where frontiers are long and spaces wide. This is a more hopeful avenue for the comparatively small mechanized forces that at present exist. Even now armoured troops will have more chance than unarmoured, since they are less liable to be stopped by fragmentary opposition.

The aim of such moves, if wisely directed, will not be to strike the enemy troops in the back—unlike the members of the ancient phalanx, they can turn about and fight—but to cut the communications on which they depend. The object will be to dislocate their organization by destroying headquarters and signal centres; to cut off supplies by destroying railways and road transport; even, if possible, to reach and attack the sources of supply. The back areas of a modern army are littered with targets that are difficult to defend; still more so is the interior of an industrialized country. And while modern conditions have increased the target, modern speed gives mechanized forces more scope for striking it than cavalry forces ever enjoyed in the past.

Such an aim will be similar, if supplementary, to that of the air forces. The speed and range that are possible in the air undoubtedly give aircraft far more chance than the fastest landcraft of attaining their aim, and evading

opposition. For this reason the mechanized land forces will probably be reserved for the shorter-range objectives in the immediate rear of the hostile army. Another function of theirs will be to strike at the enemy's aerodromes; to reduce the effectiveness of his air operations by forcing them to start farther back. The large ground organization of a modern air force is its Achilles heel.

But the rear organization of modern armies forms a still weaker spot. By its increasing complexity it has become more vulnerable just as modern speed has made it more accessible to an assailant. The old proverb 'unity is strength' no longer holds good. The more concentrated a modern army is, the more vulnerable it will be; and the larger it is, the more liable to paralysis. The conscript armies of Europe, hugely swollen on mobilization, invite more danger than they offer.

The new mobility threatens to convert mass into a boomerang for the user. Thus we may reach the paradoxical result that the larger the balance, the heavier the deficit; the bankruptcy of large armies may do more to hasten their limitation than any pacific propaganda for disarmament.

CHAPTER IV

NAPOLEON AND MECHANIZATION

THE APPLICATION OF HIS PRACTICE TO MODERN WAR

The secret of Napoleon's success, especially when he was Bonaparte, lay fundamentally in his exploitation of mobility as a means to surprise his enemy, and also to ensure his own security. Hence his practice should have peculiar value, for deduction and application, at a time when we are seeking to revive mobility by means of mechanization. If his mobility was due partly to his art it was also due, perhaps more due, to his ordinary common sense in utilizing certain inherent advantages of the new French organization. By breaking down the old military discipline, the French Revolution made the old precise drill and stereotyped rates of movement impossible. These revolutionary troops were too impetuous and undisciplined to preserve the good order and steady pace that had been the pride of the old drill-master, and so perforce the French had to abandon the orthodox 70 paces to the minute, which their opponents retained, and substitute a quick step of 120 paces. Thereby the Revolution created a military revolution, the greatest before the advent of mechanization. The quickened rate of strategic and tactical movement was the root of the French successes and made possible that rapid transference of force and bewildering 'reshuffles' of disposition whereby the French multiplied 'mass by velocity'. If a mere quickening up of leg movement could make such a difference, the far greater acceleration due to mechanical movement has all the more significant potentialities.

A second advantage, initiated prior to the Revolution, was the organization of the Army in permanent divisions. A third, linked with this, was that the chaotic supply system of the Revolutionary armies compelled a return to the old practice of 'living on the country', and the consequence was a further acceleration of movement due to the freedom from the fetters of supply trains and magazines. Small mechanized forces might in the future be able to 'live on the country' for food, all the more because of the wide range of their movements, while the increasing network of petrol pumps in all civilized countries may perhaps in some measure relieve the problem of petrol supplies. But lessons can also be learnt from other wars. How frequently have great commanders cut themselves loose from their communications for a time. As late as the American Civil War Grant did it in his Vicksburg campaign, and subsequently Sherman cut himself adrift with twenty days' rations in the manœuvres of his Atlanta campaign, while the greater daring of his 'March to the Sea' is unsurpassed.

In exploiting his inherent assets, Napoleon's practice was remarkable for its utter contradiction of many precepts which are nowadays enshrined as his legacy to us. First, there is that much-beloved and much-abused word 'concentration'. No catchword has done more harm to military thought and practice. For Napoleon's practical interpretation of it was the very opposite of the obvious. The obvious fulfilment is to hold one's forces well in hand and to keep them as closely grouped as possible. No general has kept them so scattered as did Napoleon! How can we reconcile the difference? Colin's definition of the oft-contrasted cordon system aptly meets the case—for concentration is 'not so much a matter of the distribution of the troops but of the intentions of the general'. In the seventeenth and eighteenth centuries armies commonly moved and fought as a solid block. Then with the introduction of the divisional organization there came in what

Guibert criticized as 'this fashion of never making war concentrated, of never operating with the whole army at a time'. Guibert wanted to return to the old system until the possibilities of the new dawned on him. Then he saw that 'the art will be to extend without giving an opening to the enemy, to enclose him without becoming disunited. . . . It is in this that the man of superior ability ventures more than the indifferent man.'

Napoleon Bonaparte was to be 'the man of superior ability' who could exploit the new system to gain superior mobility and surprise. In April 1796 his 60,000 men were distributed over 75 miles. When, shortly after the capitulation of the Sardinians, he undertook his great manœuvre along the Po to get on the rear of the Austrians and of Milan, his mere 30,000 men were distributed over 44 miles. Later still he spread himself over a 100-mile front on the Adige with a bare 45,000 men. And as his forces increased so did their width of distribution. The least, proportionately, was in 1812, when he had 450,000 men on a 250-mile front, and this campaign was the least productive in its manœuvres.

His wide loose grouping, initiated in 1796–97, was a snare for his opponents, in the form of a net which baffled their sight and entangled their limbs. By its very width it distended their vision, distracted their forces, and so ensured their surprise. Yet when the master was gone his disciples tightened up their dispositions more and more until they were back in the old solid block. They still organize their armies in divisions, but have missed the whole idea of the divisional system.

One source of the error is the common fault, too common in the military sphere, of inexact language. Field Service Regulations say: 'The process by which an army is assembled in the area of operations is called the strategical concentration.' It is the very opposite of what Napoleon would have called it. His word is '*réuni*', which is commonly translated 'assembled'. or, better—perhaps,

'grouped'. And he himself with subtle emphasis draws the distinction between '*réuni*' and '*concentré*'. Despite this, the term 'strategic concentration' has been customarily adopted—as a permanent source of wrong thinking and practical error.

Having thus 'concentrated' mistakenly, the next step normally is to seek and make contact. How its importance is reiterated in manual and lecture! Again it is the opposite of what Napoleon sought. To 'mystify, mislead and surprise' his opponents, his idea is to avoid contact until he is ready for and desirous of making his real coup. He constantly tells his subordinate commanders to avoid becoming engaged, unless they have the chance to wipe out some isolated detachment, and, if they surmise the presence of a large force, to swing back out of reach. And even when he concentrates his scattered forces for a stroke, the pivot if possible is a division or corps which itself is out of contact. He tries to avoid concentrating upon a pivot which is engaged with the enemy and so has lost its freedom of manœuvre, for to do so would cramp his own freedom of manœuvre. This reversal of orthodox practice in making contact is, once again, with the object of surprise. His distribution is a net which can be drawn tight round an ensnared opponent, not a solid block in which the stones are firmly cemented. Always in motion, backwards, forwards or sideways, it is as difficult a target as it is demoralizing. Napoleon would have scorned the modern craze for 'occupying positions' as much as he ridiculed the same obsession of the eighteenth-century commanders.

Yet he had to weave his net from foot-marching troops. What would he not have done if he had been endowed with mechanized troops, who lend themselves infinitely better to such fluid strategy, able to strike swiftly, to slip out of range, to be 'reshuffled' in a series of combinations far beyond Napoleon's dreams. Distribution can be much wider with equal security because concentration is more

rapid. And if Napoleon could execute his '*marche de manœuvre*' across country with infantry columns, how much easier for 'cross-country' troops who need not move in columns.

But this strategy had other logistical conditions which conduced to surprise. His divisions were of unequal strengths, and by this 'nonconformity' of organization increased the opponent's perplexity. To-day we do all in our power to simplify the labours of the 'order of battle' section of the enemy's intelligence. Again, movements are both calculated and arranged on the basis of standard rates of march and standard daily-march distances. When we formed an Experimental Mechanized Force the first thought was to get out 'standing orders', in which a formula of pace was incorporated and regulated. Napoleon, in contrast, constantly sought irregularity, and by making the day's marches of the divisions uneven both baffled the enemy's intelligence and enabled the enemy's forces to be taken unawares. To-day mechanized forces have immensely greater possibilities of this irregularity and acceleration of movement—for surprise—than Napoleon's forces possessed. How far are these possibilities appreciated and how often are they exploited in exercises? Standardization is the curse of modern armies and modern thought.

CHAPTER V

STRATEGY RE-FRAMED

Since the Armistice of 1918 there has been an abundance of discussion and a fertile outpouring of views upon the tactics and organization of armies. Further, while old shibboleths and methods have been demolished, serious and thoughtful attempts have been made to recast the foundations and to build upon them anew a structure of doctrine capable of weathering the storms of another war. The same vigorous renovation has been applied to the larger matter of war policy and the grand strategical combination of military, naval, air, economic and diplomatic action.

But pure strategy has been curiously neglected in this discussion, apart from the question of the concrete means which invention and mechanical science have made available for its employment. The post-war housing scheme of military thought has embraced the larger offices and the workmen's dwellings but concerned itself little with the question of middle-class habitations.

Yet it would surely be unnatural if an upheaval so deep and far reaching as the last war should leave strategical foundations untouched and suggest no possible improvements and developments in the structure of our strategical thought. Because of this gap, one is encouraged to attempt to draw up and put forward for consideration a fresh outline plan, which may at least serve as a basis and a beginning for discussion. Not essentially new, for anything based on historical experience cannot be truly new, it rather seeks to crystallize strategic thought more clearly and to re-define it afresh in the

light of our enlarged experience and knowledge of psychology.

Looking back now we see that strategy in the last two centuries has followed the inherent pendulum-like movement of most human concerns. In the eighteenth century it swung too far in the direction of curtailing risks, blood and battle, and in the nineteenth century, naturally, swung back to the other extreme. Can we profit by the near-ruinous lesson of 1914–18 to readjust and redistribute the balance of thought and if possible 'centre' it at the happy mean?

The technical term 'strategy' appeared in military literature early in the eighteenth century, and the prevailing conditions of warfare helped to give it the sense of its original Greek derivative—which literally meant 'the art of the general'—and even to narrow this sense. These conditions were the strength of fortification in comparison with artillery; the development of professional armies of more or less uniform cost, training and armament; the fact that wars were directed by shrewdly reasoning autocratic rulers and not by passion-swayed democracies; and the indivisibility of armies, which normally moved and fought as a single body, from which only temporary detachments were made for special missions and to hold strategic points, but not organized in permanently self-contained fractions.

These conditions tended to produce an equilibrium in the theatre of war, and on the battlefield, which easily settled into a stalemate unless upset by some ruse or stratagem on the part of one of the commanders. But the French Revolutionary and Napoleonic Wars brought about an enlargement of the meaning of 'strategy'—at first called *stratégique* in French or 'strategics' in English. The fractioning of the army into permanent divisions and Napoleon's development of this new organization, applied in his vast strategic manœuvres, caused a great acceleration and enlargement of operations. To regulate and co-

ordinate the movements of a number of widely separated columns to a common end was a task which both enlarged the power of generalship and the demands made upon the general's attention. Hence this 'logistical' meaning, that of directing the movements of an army, came to be added to the term strategy, and even to overshadow the older meaning. One effect, not a happy one, can be traced in the growing nineteenth-century tendency for the idea of the application of force, as rapidly and concentratedly as possible, to obsess military thought and leadership to the undue neglect of the subtler art of surprise by ruse and stratagem.

But the term was to undergo still further expansion of meaning in the nineteenth century. Clausewitz, in his monumental work *On War*, defined it as 'the art of the employment of battles as a means to gain the object of the war. In other words, strategy forms the plan of the war, maps out the proposed course of the different campaigns which compose the war, and regulates the battles to be fought in each'. This definition intruded on the sphere of policy, or the higher conduct of the war, which must necessarily be the responsibility of the Government and not of the military leaders it employs as its agents in the executive control of operations. At the same time the definition narrowed the meaning of 'strategy' to the pure utilization of battle, thus conveying the idea that battle was the only means to the strategical end. It was an easy step for his less profound disciples to confuse the means with the end and to reach the conclusion that in war every other interest and consideration should be subordinated to the aim of fighting a decisive battle.

To break down the distinction between strategy and policy would not matter much in cases where the two functions were combined in the same person, as with a Frederick or a Napoleon. But as such autocratic soldier-rulers have always been rare, and became extinct in the nineteenth century, the effect was insidiously harmful.

For it encouraged soldiers to make the unworkable claim that policy should be subservient to their conduct of operations. And it drew the statesman on to overstep the indefinite border of his sphere and interfere with his military employee in the actual use of his tools.

Moltke reached a clearer, and wiser, definition in terming strategy 'the practical adaptation of the means placed at a general's disposal to the attainment of the object in view'. This definition fixes the responsibility of a military commander to the Government by which he is employed. His responsibility is that of expending most profitably to the interest of the higher war policy the force allotted to him within the theatre of operations assigned to him. If he considers that the force allotted is inadequate for the task indicated he is justified in pointing this out, and if his opinion is overruled he can refuse or resign the command, but he exceeds his rightful sphere if he attempts to dictate to the Government what measure of force should be placed at his disposal.

On the other hand the Government, which formulates war policy, and adapts it to conditions which often change as a war progresses, can rightly intervene in the strategy of a campaign not merely by replacing a commander in whom it has lost confidence but by modifying his object according to the needs of its war policy. While it should not interfere with him in the handling of his tools it should indicate clearly the nature of his task. Thus strategy has not necessarily the simple object of seeking to overthrow the enemy's military power. When a Government appreciates that the enemy has the military superiority either in general or in a particular theatre, it may wisely enjoin a strategy of limited aim. It may desire to wait until the balance of force can be changed by the intervention of allies or by the transfer of forces from another theatre. It may desire to wait, or even to limit its military effort permanently, while economic or naval

action decides the issue. It may calculate that the overthrow of the enemy's military power is a task definitely beyond its capacity, or not worth the effort, and that the object of its war policy can be assured by seizing territory which it can either retain or use as bargaining counters when peace is negotiated. Such a policy has more support from history than military opinion recognizes and is less inherently a policy of weakness than its apologists imply. It is, indeed, bound up with the history of the British Empire and has repeatedly proved a lifebuoy to Britain's allies and a permanent benefit to herself. However unconsciously followed, there is ground for inquiry whether this unmilitary policy does not deserve to be accorded a place in the theory of the conduct of war.

But the more usual reason for adopting a strategy of limited aim is that of awaiting a change in the balance of force, a change often sought and achieved by draining the enemy's force, weakening him by pricks instead of risking blows. The essential condition of such a strategy is that the drain on him is disproportionately greater than on oneself. The object may be sought by raiding his supplies, by local attacks which annihilate or inflict disproportionate loss on parts of his force, by luring him into unprofitable attacks, by causing an excessively wide distribution of his force and, not least, by exhausting his moral and physical energy. Such a strategy is popularly called Fabian, after the illustrious Roman who thereby thwarted Hannibal's designs in Italy. More strictly it was a Fabian war policy, and this closer definition sheds light on the question, previously raised, of a general's independence in carrying out his own strategy inside his theatre of operations. For if the Government has decided upon a Fabian war policy, the general who, even within his strategic sphere, seeks to overthrow the enemy's military power may do more harm than good to the Government's war policy. Usually a war policy of limited aim imposes a strategy of limited aim, and a decisive aim should only be

adopted with the approval of the Government which alone can decide whether it is 'worth the candle'.

We can now crystallize our thought into a shorter, simpler, and perhaps more exact definition of strategy as '*the distribution and transmission of military means to fulfil the ends of policy*'. It is concerned not merely with the movements of armies, as its rôle is often defined, but with the effect. But when the application of the military instrument merges into actual fighting, the dispositions for and control of such direct action are termed 'tactics'.

The two categories, however, although convenient for discussion, can never be truly divided into separate compartments because each not only influences but merges into the other. Nor has clear thought been assisted by the attempts to subdivide into or to bridge the indefinite dividing line by fresh categorical definitions. First among these was the term 'grand tactics', which came into use in the late eighteenth century to express the combination and movements of forces preparatory to and in readiness for the battle. This term likewise has undergone changes of meaning, and is often employed to denote the plan upon which the application of military force, as distinct from other agencies, is to be based.

A term which fills a greater need, and is less productive of confusion, is that of 'grand strategy'. If practically synonymous with the policy which governs the conduct of war, as distinct from the permanent policy which formulates its object, the term 'grand strategy' serves to bring out the sense of 'policy in execution'. For the rôle of grand strategy is to co-ordinate and direct all the resources of a nation towards the attainment of the political object of the war—the goal defined by national policy.

PURE STRATEGY.—Having cleared the ground, we can build up our conception of strategy on its original and true basis—that of 'the art of the general'. This depends for success, first and most, on a *calculation and co-ordination of the end and the means*. The end must be proportioned to the total

means, and the means used in gaining each intermediate end which contributes to the ultimate must be proportioned to the value and needs of that intermediate end—whether it be to gain an objective or to fulfil a contributory purpose. An excess may be as harmful as a deficiency. A true adjustment would establish a perfect economy of force, in the deeper sense of that oft-distorted military term. But, because of the nature and uncertainty of war, an uncertainty aggravated by its unscientific study, a true adjustment is beyond the power of military genius even, and success lies in the closest approximation to truth. This relativity is inherent because however our knowledge of the science of war, at present an almost unexplored region, be extended, war is a science which depends on art for its application. Art can not only bring the end nearer to the means, but by giving a higher value to the means enable the end to be extended. This complicates calculation, because no man can exactly calculate the capacity of human genius and stupidity nor the incapacity of will.

ELEMENTS AND CONDITIONS.—Nevertheless, in strategy calculation is simpler and a closer approximation to truth possible than in tactics. For in war the chief incalculable is the human will, which manifests itself in resistance, which in turn lies in the province of tactics. Strategy has not to overcome resistance, except from nature. *Its purpose is to diminish the possibility of resistance*, and it seeks to fulfil this purpose by exploiting the elements of movement and surprise.

Movement lies in the physical sphere and depends on a calculation of the conditions of time, topography and transport capacity. By transport capacity one implies both the *means by which* and the *measure in which* force can be both moved and maintained.

Surprise lies in the psychological sphere and depends on a calculation, far more difficult than in the physical sphere, of the manifold conditions, varying in each case, which are likely to affect the will of the opponent.

Although strategy may aim more at exploiting movement than at exploiting surprise, or conversely, yet the two elements react on each other. Movement generates surprise, and surprise gives impetus to movement. For a movement which is accelerated or changes its direction inevitably carries with it a degree of surprise, even though it be unconcealed; while surprise smooths the path of movement by hindering the enemy's counter-measures and counter-movements.

As regards the relation of strategy to tactics, while in execution the borderline is often shadowy, and it is difficult to decide exactly where a strategical movement ends and a tactical movement begins, yet in conception the two are distinct. Tactics lies in and fills the province of fighting. Strategy not only stops on the frontier, but has for its purpose the reduction of fighting to the slenderest possible proportions.

Aim of Strategy.—This statement may be disputed by those who conceive the destruction of the enemy's armed forces as the only sound aim in war, who hold that the only goal of strategy is battle, and who are obsessed with the Clausewitzian saying that 'blood is the price of victory'. Yet if one should concede this point and meet its advocates on their own ground, the statement would remain unshaken. For even if a decisive battle be the only goal, all recognize that the object of strategy is to bring about this battle under the most advantageous circumstances. And the more advantageous the circumstances, the less proportionately will be the fighting.

The perfection of strategy would therefore be to produce a decision—the destruction of the enemy's armed forces through their unarming by surrender—without any fighting. History provides examples where strategy, helped by favourable conditions, has practically produced such a result. Caesar's Ilerda campaign was one, Cromwell's Preston campaign another, while in recent times there have been the operations which culminated at Sedan

in 1870 and between Galilee and the hills of Samaria in 1918.

It rests normally with the Government, responsible for the grand strategy of a war, to decide whether strategy should make its contribution by achieving a military decision or otherwise. And just as the military is but one of the means to the end of grand strategy—one of the instruments in the surgeon's case—so battle is but one of the means to the end of strategy. If the conditions are suitable, it is usually the quickest in effect, but if the conditions are unfavourable it is folly to use it.

Let us assume that a strategist is empowered to seek a military decision. His responsibility is to seek it under the most advantageous circumstances in order to produce the most profitable result. Hence his true aim is not so much to seek battle as to seek a strategic situation so advantageous that if it does not of itself produce the decision its continuation by a battle is guaranteed to do so. In other words dislocation is the aim of strategy; its sequel may either be the enemy's dissolution or his disruption in battle. Dissolution may involve some partial measure of fighting, but this has not the character of a battle. Famous examples from history, beyond those already quoted, include Hannibal at Trasimene, Turenne's last campaign in Alsace, and Napoleon's Ulm campaign. Among clear cases where disruption was an inevitable sequel to the strategic advantage previously gained one may instance Scipio's campaign of Ilipa, Cromwell's of Worcester, Napoleon's of Jena, Grant's of Vicksburg.

ACTION OF STRATEGY.—How is the strategic dislocation produced? In the physical, or 'logistical', sphere it is the result of a move which (*a*) upsets the enemy's dispositions and by compelling a sudden 'change of front' dislocates the distribution and organization of his forces; (*b*) separates his forces; (*c*) endangers his supplies; (*d*) menaces the route or routes by which he could retreat in case of need and re-establish himself in his base or home-

land. A dislocation may be produced by one of these effects but is more often the consequence of several. Differentiation, indeed, is difficult because a move directed towards the enemy's rear tends to combine these effects. Their respective influence, however, varies and has varied throughout history according to the size of armies and the complexity of their organization. With armies which 'live on the country', drawing their supplies locally by plunder or requisition, the line of communication has negligible importance. Even in a higher stage of development, a small force has less dependence on the line of communication and enables supplies to be transported with it for limited periods. The larger an army and the more complex its organization the more prompt and serious in effect is a menace to its line of communication.

Where armies have not been so dependent, strategy has been correspondingly handicapped, and the tactical issue of battle has played a greater part. Nevertheless, even thus handicapped, strategic artists have frequently gained a decisive advantage previous to battle by menacing the enemy's line of retreat, the equilibrium of his dispositions, or his local supplies.

To be effective such a menace must usually be applied at a point closer in time and space to the enemy's army than a menace to his communications, and thus in early warfare it is often difficult to distinguish between strategical and tactical manœuvre.

In the psychological sphere, dislocation is the result of the impression on the commander's mind of the physical effects which we have listed. The impression is strongly accentuated if his realization of being at a disadvantage is sudden, and if he feels that he is unable to counter the enemy's move. *Psychological dislocation, indeed, fundamentally springs from the sense of being trapped.* This is the reason why it has most frequently followed a physical move on to the enemy's rear. An army, like a man, cannot

properly defend its back from a blow without turning round to use its arms in the new direction. 'Turning' temporarily unbalances an army as it does a man, and with the former the period of instability is inevitably much longer. In consequence, the brain is much more sensitive to any menace to its back. In contrast, to move directly on an opponent is to consolidate his equilibrium, physical and psychological, and by consolidating it to augment his resisting power.

In war as in wrestling the attempt to throw the opponent without loosening his foothold and balance tends to self-exhaustion, increasing in disproportionate ratio to the effective strain imposed upon him. Because of this disproportion, which increases as the effort advances, victory by such a method can only be attainable if the assailant possesses a great margin of strength. Even so, it tends to lose decisiveness, for in the case of an army it rolls the enemy back towards their reserves, supplies, and reinforcements, so that as the original front is worn thin new layers are added to the back. And, at best, it imposes a strain rather than producing a jar.

Thus a move round the enemy's front against his rear has the aim not only of avoiding resistance on its way but in its issue. In the profoundest sense, it takes *the line of least resistance*. The equivalent in the psychological sphere is *the line of least expectation*. They are the two faces of the same coin, and to appreciate this is to widen our understanding of strategy. For if we merely take what obviously appears the line of least resistance, its obviousness will appeal to the opponent also and this line may no longer be that of least resistance. In studying the physical aspect we must never lose sight of the psychological, and only when both are combined is the strategy truly an indirect approach, calculated to dislocate the opponent's equilibrium.

For example, Hannibal in 217 B.C. took the line of least resistance and least expectation by moving into Etruria

through the marshes and on to the rear of the Roman army encamped at Arretium.

But, after ravaging the country, he then moved straight on, and by thus appearing to ignore contemptuously this Roman army impelled the consul Flaminius, far more strongly than by any threat to his rear or supplies, to rush precipitately on Hannibal's heels and into the deadly ambush at Lake Trasimene.

Again, Schlieffen, framing the German plan for 1914, sought a logistical indirect approach by sweeping through Belgium with a massive right wing. But the real subtlety of his plan was not on his right but on his left, which he made so weak that any French offensive in Lorraine would push it back. And the farther it was pushed back, the farther would the French be committed in this direction and the more would their rear be exposed to the sweep of his right wing through Belgium. Like a neck their communications would be stretched out to receive the falling axe. The plan was shrewdly based on an insight into the French temperament and their new doctrine of the headlong offensive. Indeed, in the event, the French 'head' was laid blindfold on the block. But, unfortunately for Germany, Schlieffen's successor, Moltke, failed to grasp his conception and, fearing the weakness of the left wing, so strengthened this as to counteract its essential purpose. While the French rushed to fall into the trap, Moltke rushed German troops to save them. An irony of history.

Thus we see that the mere fact of marching indirectly towards the enemy and on to the rear of his dispositions does not constitute a strategic indirect approach. Strategic art is not so simple. Such an approach may start by being indirect in relation to the enemy's front, but by the very directness of its progress towards his rear may allow him to change his dispositions so that it soon becomes a direct approach to his new front.

Because of the risk that the enemy may achieve such a change of front, it is usual, and usually necessary for the

dislocating move to be preceded by a move or moves, which can perhaps best be classified under the term 'distract' in its literal sense of 'to draw asunder'. The purpose of this 'distraction' is to deprive the enemy of his freedom of action, and it should operate in both the physical and psychological spheres. In the physical, by causing a distension of his forces or their diversion to unprofitable ends, so that they are too widely distributed and too committed elsewhere to have the power of interfering with one's own decisively intended move. In the psychological sphere, the same effect is sought by playing upon the fears of, and by deceiving the opposing command. 'Stonewall' Jackson realized this when he framed his strategical motto—'Mystify, mislead and surprise.' For to mystify and to mislead constitutes 'distraction', and surprise is the essential cause of 'dislocation'. And it is through the 'distraction' of the commander's mind that the distraction of his forces follows. The loss of his freedom of action is the sequel to the loss of his freedom of conception.

Realizing how the psychological permeates and dominates the physical sphere, we begin to see what Napoleon meant by his famous dictum that 'the moral is to the physical as three to one'. This realization warns us, too, of the fallacy and shallowness of attempting to analyse and theorize about strategy in terms of mathematics. To treat it quantitatively, as if the issue turned merely on a superior concentration of force at a selected place, is as faulty as to treat it geometrically as a question of lines and angles. Voluminous works have been devoted to a 'compartmented' analysis of strategy under such headings as 'the relation between the fronts of opposing armies and their respective lines of communication with their base'. 'Case of both armies forming on a front parallel to the line of communication with the base', and so on.

Even more remote from truth—because in practice it usually leads to a dead end—is the 'grooved' tendency, especially characteristic of modern textbooks, to treat war

as mainly a matter of concentrating superior force. In his celebrated definition of economy of force Foch termed it—'The art of pouring out *all* one's resources at a given moment on one spot; of making use there of *all* troops, and, to make such a thing possible, of making those troops permanently communicate with each other, instead of dividing them and attaching to each fraction some fixed and invariable function; its second part, a result having been attained, is the art of again so disposing the troops as to converge upon, and act against, a new single objective.'

It would have been more exact, and perhaps more lucid, to say that an army should always be so distributed that its parts can aid each other and combine to produce the maximum *possible* concentration of force at one place, while the minimum force *necessary* is used everywhere to prepare the success of the concentration.

To concentrate *all* is an unrealizable ideal. And dangerous even as a hyperbole. Moreover, in practice the 'minimum necessary' may form a far larger proportion of the total than the 'maximum possible'. It would even be true to say that the larger the force that is effectively used for *distraction* of the enemy, the greater is the chance of the concentration succeeding in its aim. For otherwise it may strike an object too solid to be shattered. Superior weight at the intended decisive point does not suffice unless that point cannot be reinforced *in time* by the opponent. It rarely suffices unless that point is not merely weaker numerically but has been weakened morally. Napoleon suffered some of his worst checks because he neglected this guarantee. And the need for *distraction* has grown with the delaying power of weapons.

Basis of Strategy.—For the deeper truth to which Foch and the other disciples of Clausewitz did not penetrate fully is that *in war every problem, and every principle, is a duality*. Like a coin, it has two faces. Hence the need for a well-calculated compromise as a means to reconciliation. This is the inevitable consequence of the fact that

war is a two-party affair, so imposing the need that while hitting one must guard. Its corollary is that, in order to hit with effect, the enemy must be taken off his guard. *Effective* concentration can only be obtained when the opposing forces are dispersed; and, usually, in order to ensure this, one's own forces must be widely distributed. Thus, by an outward paradox true concentration is the fruit of dispersion. Napoleon realized this when he spoke of holding his army *réunie*—it was assembled in potentiality but not in physical unity. To strike with strong effect one must strike at weakness. To destroy the bulk of the enemy's force one destroys fragments.

A further consequence of the two-party condition is that to ensure reaching an objective *one should have alternative objectives*. Herein lies a vital contrast to the single-minded nineteenth-century doctrine of Foch and his fellows—a contrast of the practical to the theoretical. For if the enemy is certain as to your point of aim he has the best possible chance of guarding himself—and blunting your weapon. If, on the other hand, you take a line that threatens alternative objectives, you distract his mind and forces. This, moreover, is the most economic method of *distraction*, for it allows you to keep the largest proportion of your force available on your real line of operation—thus reconciling the greatest possible concentration with the necessity of dispersion.

The absence of an alternative is contrary to the very nature of war. It sins against the light which Bourcet shed in the eighteenth century by his most penetrating dictum that 'every plan of campaign ought to have several branches and to have been so well thought out that one or other of the said branches cannot fail of success'. This was the light that his military heir, the young Napoleon Bonaparte, followed in seeking always, as he said, to *'faire son thème en deux façons'*. Seventy years later Sherman was to relearn the lesson from experience, by reflection, and to coin his famous maxim about ' putting the enemy

on the horns of a dilemma'. In any problem where an opposing force exists, and cannot be regulated, one must foresee and provide for alternative courses. Adaptability is the law which governs survival in war as in life—war being but a concentrated form of the human struggle against environment.

While the commander may initially decide to seek alternative objectives, if the enemy concentrates to cover this he will be wise to strike the other, more exposed. A plan must have branches like a tree if it is to bear fruit. A plan with a single aim is like a barren pole.

A prolonged abstract analysis of psychological strategy would be wearisome without being helpful, for it is only possible to probe into the mind of a commander through the medium of historical examples. But such study of military history should be directed mainly to discover the commander's thoughts and impressions and the decisions which sprang from them. To explore all the details of the fighting is unnecessary, valueless and even misleading. For it matters little what the situation actually was at any particular point or moment; all that matters is what the commander thought it was. Weapons and conditions change so much in each generation that anything but the broadest survey of battles and movements is not only unprofitable but liable to fill the student's head with masses of historical lumber to the exclusion of thought. Human nature, however, changes but slowly, if at all; and human nature, under stress of danger, not at all.

Military history to be of practical value should be a study of the psychological reactions of the commanders, with merely a background of events to throw their thoughts, impressions and decisions into clear relief. The supreme value of Henderson as compared with Hamley was that he focussed attention on the commander's psychology instead of on his geometry, that he let us into his mind

instead of merely showing us his limbs working. But even Henderson's *Stonewall Jackson* would have been just as valuable and its lessons more easily assimilated if it had been in one short volume instead of two long ones, besides avoiding the justified criticism that its facts and details were sometimes inaccurate.

What of the future? Here we pass from the broad construction of a frame for strategic thought to the question of its application. Without drawing any hard and fast deductions, one may indicate certain impressions derived from a study of past and present tendencies.

Reflection suggests, and history confirms, that a direct approach is the worst of all military 'risks'—worse than the passage of mountains, deserts or swamps, worse than that of cutting oneself loose from one's supplies or of operating with inferior force. Natural hazards, however formidable, are inherently less dangerous and uncertain than fighting hazards. *For all conditions are more calculable, all obstacles more surmountable than those of human resistance.* By reasoned calculation and preparation they can be overcome almost 'to time-table'.

It was Clausewitz who, reacting against the 'geometrical' interpretation of Napoleon's strategy, laid down that 'the independent will-power of his opponent' is the least calculable and most formidable of the factors with which a commander has to deal. But his line of thought and teaching led him to place excessive emphasis on force applied through the bodies of a commander's troops as the means of damaging the commander's will. It is curious that he should have neglected the heightened power and speed of impressions made immediately on the opposing commander's mind, in favour of impressions made through a 'third-party' channel. But the teaching of Clausewitz was directed more to fortify the will of the commander on his own side than to undermine the will of the opposing

commander. And he was a cultivator of expectancy, rather than an exponent of the unexpected.

The historical significance of his tendency is great, for on his doctrine were formed the minds of Moltke and the generation of 1870, and indirectly through them, as well as directly, its influence was widened during the interval between 1870 and 1914. Indeed, the plan on which the French went to war in 1914 was the spiritual heirloom of Clausewitz.

Hence, force overshadowed surprise and mobility on the strategical horizon of the nineteenth and early twentieth centuries. Hence the relative neglect not only of psychological surprise but of new inventions which might contribute to it. So also with mobility—rate of movement was treated as an invariable factor. In staff rides and exercises, calculations and plans were based on 'normal' times, and little research was made into the advantages of unexpected acceleration by new means or by a partial sacrifice of strength and convenience. In contrast to Napoleonic practice, undue stress was laid on the importance of bringing a force entire to its destination—tying it to the pace of its slowest elements. Equally neglected was the lesson contained in Napoleon's *marche de manœuvre*—guns and trains upon the road, infantry and cavalry moving across country. Even since the World War, although the strategic value of tanks and the newer forms of transport lies as much or more in their power of cross-country movement as in their speed, the strategic advantages of such movement are rarely applied or realized.

The obsession with force had a still worse effect on the conception of surprise. In the words of Foch's pre-war teaching it amounted to no more than 'crushing an opponent from *a short distance* by *numbers* in a *limit of time*'. It was thus reduced to mathematics; and its production, to mechanics. The variety of surprise produced by the Great Captains, and its compound means, were dismissed with the comment: 'Setting an ambush, attacking in

reverse, are possible in a small war, but impracticable in a great one.' Can we be surprised that among the commanders of 1914 there was so little research for anything beyond mathematical surprise? Can we wonder that the rediscovery of surprise, in its artistic range, was delayed until late in the war?

It is true that the scale of the forces tended to restrict the effect of surprise, and brought new difficulties into its execution. Obviously, an ambush—in the literal sense—could no longer be framed, except as a local incident. But there was scope for a subtle adaptation of the ambush idea—as was shown in the second battle of the Marne in July 1918. Even the first battle of the Marne in 1914, if an undesigned illustration, had pointed the way to revived possibilities.

It is also true that the advent of aircraft tore aside the veil which formerly had hidden strategic manœuvres. But, in compensation for loss of concealment, it opened fresh opportunities for deception, and was an incentive to more subtle ingenuity—which might replace the veil with a false nose.

The treatment of surprise in the works of Foch and most of his contemporaries was too narrow and too shallow. Thus it failed to counteract the military predisposition towards physical action. Up to a point Foch's diagnosis was discerning. For he pointed out that 'an army is a living and organized being. Now an organism is a set of organs, the health and good condition of all of which are necessary to the individual life'. But then he went too far, regardless of the very expansion of forces which had led him to dismiss the possibilities of ambush in a modern war. 'A loss in these organs—be it only the loss of one of them—brings about death. To beat an adversary it is not necessary "to sever his arms, his legs and his head, pierce his chest and burst open his belly all at once". One sword thrust to the heart, or one stunning blow on the head, ensures the result.'

Here Foch carried simplification too far. The thrust to the heart or the blow on the head would doubtless be decisive. But these organs will naturally be well guarded, the most guarded. It will only be possible to strike them by means of some masterly deception, or, more likely, after the paralysis of lesser organs has weakened the opponent's power to guard his major organs. And it is in this preparatory weakening, this crippling of functional activity, that real surprise has scope, and is necessary.

Foch, again, showed real understanding when he declared that to break the chain of control is 'to put a stop at once to the functioning of all ranks, to transform tactical units into mere masses of men. . . . And in order to break it, all you need do is to spread moral or physical disorder; to overthrow the organization at *one point* of the system'. Here, once more, he went too far in assumption and not far enough in analysis. For the effect of a break at one point is counteracted by the increased size of forces, and by their being composed of self-contained bodies. In such conditions it becomes more effective to play on the mind of the enemy commander than on the bodies of a section of his men. His mind is more accessible to the general influence of local effect.

But Foch's idea of surprise was, as he said, guided by 'mechanics' and consisted '*in applying superior forces at one point*', the reserve being used as 'a *club* . . . hurled as one block'. Unhappily this conception was built on a fallacy; it was already undermined by the improvement of weapons to which Foch and his contemporaries gave so little heed. The theory of the Greek phalanx, with its reliance on mass, is nullified by the machine gun. The more ranks the more swathes of dead—that is all. Mechanics may enable you to concentrate a reserve five or ten lines deep at a point held by only one line of opponents, but this is no use if your front line cannot break through that one line. In face of this hard reality, the mechanistic theory of surprise broke down in the World

War. The problem of surprise was found to be in the first place psychological, and only second, mechanical. To break the line one had to revive, if also to adapt, the old tricks of surprise practised throughout the ages in the 'small war' which nineteenth-century students so much despised. Once broken, mechanics were called into play to expand the opening and prevent its repair—to solve the problem of maintaining speed and continuity of advance in the exploitation. If that problem was not fully solved before the war ended, it was perhaps because thought was too much mechanized, and the instrument not enough.

This failure of comprehension is perhaps the less surprising when, in studying the history of the past hundred years, we see the failure of strategists to grasp the idea underlying Napoleon's use of the divisional system. By 1870 the intervals had become much narrower and by 1914 armies were back in the old solid block, with the divisions rubbing shoulders in a long, inflexible, unmanœuvrable line. Yet all the time the increasing range of weapons had progressively diminished the risk and increased the profit of leaving intervals—of a calculated dispersion of force for a concentrated purpose. For the divisional organization was by its nature a fresh aid to the strategy of indirect approach, whose psychological purpose may be epitomized in the one word 'trap'. The varied forms of the indirect approach are to be seen in the campaigns of the Great Captains, but such an historical survey serves to show that even in past experience its effect has most often been produced—the trap baited—by a military move directed against an economic target, the sources of supply of the opposing state or army. The future is likely to strengthen this experience, for national conditions and the development of civilization are bringing new influences to bear on strategy and opening to strategy new channels of influence. These were foreshadowed in the American Civil War.

For, with the growth of democracy the war-will of the opposing power has become more diffused and more sensitive. And with the growth of social organization, of means of communication and of the interdependence of districts, the economic target has proportionately outgrown the military target. Just as strategy gained increased power, in comparison with tactics, when armies become dependent on lines of communication for their supply, so it has gained a further increase, and widened its scope, through the dependence of nations on 'lines of communication'. The concentration of a modern nation's food supplies, as also now of its water, light and heat supplies; the complex web of its commerce and industry; the sense and fact of the interdependence of its centres of population—all combine to afford a wider sphere of influence and new ways of influencing the enemy's will.

To overthrow the enemy's armed forces may still be the quickest and most effectual way to cause the collapse of the enemy nation's will to resist—if it can be achieved. But the new civil conditions provide a far stronger argument against attempting it unless the military conditions are highly favourable to its success. The civil conditions give the strategist not only an alternative channel of action but an additional lever towards his military aims. By threatening economic objectives he may be able both to distract and dislocate the enemy's military dispositions, while the greater frequency and sensitiveness of such quasi-civil objectives make them more difficult to cover, and give him more opportunities to slip past the military shield and strike at them with decisive results. This potential development of strategy is greatly favoured by the advent of the air weapon, which introduces a third dimension of movement, and thus incalculably enlarges the scope for surprise. Aircraft came endowed with a knight's move to supplement the military bishops and rooks on the chessboard of war.

PART TWO

CHAPTER VI

THE FUTURE OF ARMAMENT—AND ITS FUTURE USE

(This chapter was written in 1930, and has been left unchanged in substance, so that readers may be able to gauge in later chapters the subsequent development of military ideas.)

Science and history are opposing factors in the problem of the future means and methods of war. Anyone who seeks to solve the problem thoughtfully, instead of sensationally, soon feels their contradictory pull upon his mind. In a dual sense it is a tug of war.

The progress of scientific discovery and invention is so fast, even though it does not keep pace with the imagination of those who exploit it in the popular Press, that it would seem to be changing all traditional conceptions of warfare.

We have learnt, rightly, to distrust those who say of any new development that it is impossible, unworkable, or inapplicable. We have come, perhaps too readily in an historical sense, to assume that the vision of to-day will be the facts of to-morrow. Hence the ready ear accorded to those who paint lurid pictures of cities wiped out by new forms of explosives, of armies suffocated by new gases, of peoples annihilated by bacilli. The possibilities of atomic energy and radio waves transcend even these speculations. To-day is the heyday of the death-ray inventor and of the imaginative publicist who can make hay, financially, while the sun of science shines so splendidly as to dazzle the popular imagination.

Meantime the armed forces of the Great Powers browse placidly in their accustomed pastures, apparently as un-

disturbed by the march of science as by the headlong leaps of the 'popular scientist'. It is a curious contrast. The structure of most of these forces, far from being a development upon that of 1918, resembles that of the years before 1914, save for the appearance of sundry external accretions. It is reasonable that the armed forces should deal with facts and not with dreams; that their form and theory should not yet be affected by scientific visions yet unrealized. But it is irrational that they should have shown so little power of adaptation to the changed conditions already produced by weapons that have been tried in war and have been in continuous development since.

As early as the autumn of 1914 a sprinkling of machine guns converted the attacking lines of infantry into swathes of corpses or, alternatively, chains of human moles. Only when the industrial resources of the nation had been converted to the manufacture of shells in vast quantity could the infantry emerge from their burrows. Only when the new gas and tank weapons had been extensively developed could they actually break through the opposing line, held essentially by machine guns. Yet to-day, twelve years after the war, the bulk of most armies still consists of infantry, and faith is still pinned to the idea of their attack, although machine guns are more numerous than ever in proportion to numbers of men, while the use of gas is banned and the use of tanks is on a puny experimental scale.

Again, it was in March 1918 that aircraft squadrons attacked the enemy's marching columns and their transport with such effect as to be one of the main factors in paralysing the German onrush towards Amiens.

The use of aircraft was merely a diversion, compelled by the emergency, from their recognized subsidiary rôle of serving as the eyes of the armies or blinding the eyes of the enemy. But in the closing months of the war it was air attack, again revived, which dispersed the retreating columns of the Bulgars, Turks and Austrians, in turn,

into fugitive mobs. Slender as this experience, because of belated trial, it sufficed to reveal a new truth. Troops who are constantly forced to halt, break their ranks and seek cover will never reach any strategic goal. And if deprived of food and ammunition they are reduced to helplessness. The greater the numbers the greater the encumbrance. The advent of air attack has given a new meaning and a new force to Marshal Saxe's acute verdict two centuries ago—that 'multitudes serve only to perplex and embarrass'. Yet in 1930 we still find most nations placing their trust in weight of numbers, while even those who abjure large conscript armies do so for political rather than military reasons, and maintain their own professional armies on the traditional pattern. As smaller replicas they may suffer less, but can hardly effect more.

As early as August 1915 occurred the first sinking of a ship by a torpedo fired from a seaplane. It was a merchant ship, and the failure to repeat the feat was due, on the Allied side, to the subsequent absence of enemy merchant ships at sea. On the other side, imitation was debarred by the distance of Allied sea routes from the Germans' seaplane bases; they relied throughout on submarines for commerce destruction. These brought Britain to the verge of starvation, although the total of submarines on active service never rose above 140, and although the campaign was conducted from the most unfavourable geographical situation. To-day the seaplane or flying boat is a greater potential threat to seaborne commerce than ever was the U-boat; its range has so extended that the Mediterranean, for example, has been reduced to a narrow channel wherein the flow of merchant shipping could be blocked as easily as of yore in the English Channel.

If the fact that the first ship sunk from the air was a merchant ship has a prophetic significance, this does not exhaust its significance. Owing to the necessity of displacing a volume of water equal to its own weight, the under-water hull of any warship is virtually a gigantic

egg-shell. The term is apt because it expresses the essential fragility of the steel skin—no thicker than a matchbox. While the use of an inner shell or hull subdivided into multiple compartments minimizes the danger of actual sinking, it cannot prevent such damage as would suffice to lame the ship while at sea and force it subsequently to lay up in dock for repair. No precautions, moreover, can safeguard the propellers and rudder of a ship from the danger of an under-water explosion. One lame unit is a handicap to any fleet, affecting the whole; several units damaged simultaneously would strain the dockyard capacity of any nation. The implications are obscured by the popular and even professional delusion that only sinkings count. This is a fallacy akin to the idea of 'killing' in land warfare. In reality, it is more fruitful to wound than to kill. While the dead man lies still, counting only one man less, the wounded man is a progressive drain upon his side. Comrades are often called upon to bandage him, sometimes even to accompany him back; stretcher bearers and ambulance drivers to carry him back; doctors and orderlies to tend him in hospital. And on his passage thither the sight of him tends to spread depression among the beholders, acting on morale like the drops of cold water which imperceptibly wear away the stone. So at sea crippled ships have a cumulative effect in crippling the fleet, both directly and indirectly.

Paralysis, rather than destruction, is the true aim in war, and the more far reaching in its effects. To ensure this paralysis even actual damage is not necessary; the fear of it will suffice, as the last war proved. Although the British Grand Fleet remained in 'command' of the surface of the North Sea after Jutland in 1916, it was itself confined, like an old-time debtor in the Fleet Prison, by the fear of under-water attack. Debarred altogether from the southern half of the North Sea, it could not even put to sea from its far northern base without an escort of nearly a hundred destroyers. And when the

danger of a German invasion of Denmark loomed up, the British Government was faced with the confession that 'for naval reasons it would be almost impossible to support the Danes at all'. If so complete a paralysis could be brought about by such a slow and half-blind antagonist as the submarine, it would seem to be far more certain to occur in future whenever a battle fleet is within flying range of any coastline.

In face of these outstanding deductions from actual experience of war, these logical portents, it is curious to see no radical change in the structure of modern armies and navies. What is the explanation? We can find it in history, for history acts as a firm check on rational assumptions that the weapons and methods of another war will correspond with the state of science at the time of its outbreak.

It is a popular comment that every war is different from the last. Actually, a survey of the whole course of military history brings out, as a dominant fact, the remarkably gradual evolution of military methods, and the slight difference of technique between one war and the next. Rarely do we find that even the contemporary experience of one war has been applied to the structure and tactics of armies when the next war overtakes them, sweeping them up like driftwood in a flood. Still more rarely has anyone taken time by the forelock and ensured victory by anticipating the trend of warfare.

The utilization of new weapons in war has followed far behind the period at which they were technically possible or even produced. Even Napoleon, who wrought such great changes in military methods, was curiously indifferent to the opportunity of introducing new weapons, and his era of warfare, notably unproductive, although it coincided with the neap tide of the Industrial Revolution. So also in the American Civil War, which produced the highest level of generalship that has been seen since, armament lagged well behind the pace of invention.

Both North and South went to war with muzzle-loading muskets, and even in the last year of the conflict breech-loading magazine rifles had been belatedly adopted by a small proportion of the troops, who thereby had a decisive influence, out of all proportion to their numbers, in the critical battles near Atlanta and at Franklin. It was the acute verdict of the Confederate, General Alexander, that 'had the Federal infantry been armed from the first with even the breech-loaders available in 1861, the war would have been terminated within a year'.

The evolution of methods is even slower, because any step forward is usually followed by a slip backward. In *All our Yesterdays*, H. M. Tomlinson remarks, 'The war the Generals always get ready for is the previous one.' He is wrong. Hitherto, the war they have prepared for has been the last but one. If the French Army in 1914 had gone to war with the methods learnt in 1870 it would have fared much better, and the manhood of France would have suffered much less. The first post-war doctrine after 1870 was as practical as the last pre-war doctrine of 1914 was fantastic. Between the methods of 1918 and the French textbooks issued immediately after 1870 one finds only a difference of degree. But the textbooks of 1914 are far removed from 1918—as far as the Crimea.

The idea that every war has been different from the last is the delusion of those who know not history. The next war has normally begun where the last left off, with, perhaps, a slight modification, governed not by the actual development of weapons in the interval but by such fractions of that development as have been recognized and incorporated during peace time. The Armies, however, have usually begun where the last war began. In consequence, they were discomfited. And public opinion complained that they had stood still while warfare had changed. It failed to realize that the Armies had moved—backwards.

The fallacy of imagining that each war is different from its predecessor can be seen by comparing 1914 with 1904.

Nearly every disconcerting development which upset calculations in the World War was foreshadowed by the Russo-Japanese War—the paralysing power of machine guns, the hopelessness of frontal attacks, the consequent development of trenches and barbed wire and, to counter them, of grenades and heavy guns. In the light of the Russo-Japanese War it did not require a seer to foretell that, with much larger armies in a smaller space, the entrenched fronts would soon stretch across the whole frontier and stagnation ensue. Twenty years before, a Polish banker and amateur of war, M. Bloch, had foreseen it. And the only ground for surprise is that so few believed him. For even he was thirty years late in his discovery. Most of the officially unexpected experiences of the World War could have been deduced from a study of the American Civil War—its prototype. And even the ultimate factors which brought about the collapse of the Confederacy were repeated in the decline and fall of the Germanic alliance.

Hence speculation as to the nature of another war is not so vain as superficial cynics would suggest. Cynicism is justified—but at the certainty of conservatism rather than at the possibility of calculation. To predict the ultimate conditions and weapons of another war may be rash, but not so to gauge what they will be at the start. And this question is all that concerns any practical inquiry into the future of armament. Using historical experience as a springboard from which to take off, we arrive at the conclusion that it will be merely an improvement of existing types. The recent acceleration of mechanical progress is likely to correct the backward swing of the military pendulum, but can hardly do more. Science will still be held in check by history.

Hence we may discount the adoption of 'death rays' and other revolutionary weapons—the pigeon-holes of the War Departments are the most effective of antidotes to any new poison. An anecdote may emphasize the point.

After the last war the plans of a tank, designed in 1912 and more advanced than the actual machine of 1916, were unearthed from the dusty recesses of the British War Office and found to bear this brief verdict of authority—'The man's mad.' Thus although it is not impossible that an effective ray might be discovered, it is improbable that any such weapon would be utilized at the outset of another war. The possibilities of germ warfare may be discarded even more emphatically. Spreading disease is too obviously an uncontrollable weapon, and thus unpleasantly two-edged in the eyes of any people. Even if any government was capable of sanctioning a weapon so uncertain in its physical and so certain in its moral recoil—Germany's experience has shown the boomerang effect of shocking the world's conscience—the soldiers may be trusted to prevent any risk of their being superseded by the bacteriologist.

Gas is in a different category. Now that its novelty is past it would be difficult to kindle any crusading enthusiasm against its use, for it is manifestly irrational to argue that the mutilations of high explosive are more humane than gas. Hence we may anticipate that prohibitions will be evaded. But this is not an endorsement of the sensational predictions that armies will be stricken as suddenly as the Assyrians in Biblical myth, that cities will fall into the sleep of death under the discharge of some unknown gas. Chemists tell us that the discovery of entirely new gases is unlikely, and that future progress is likely to be along the line of producing variants of the main types of chemical compound already known. Of these the acute lung irritants, such as chlorine and phosgene—the essentially lethal gases—proved less effective than, and were gradually superseded by, the sensory irritant smokes, such as diphenyl chlorarsine, and vesicants, such as dichlorethyl sulphide, commonly known as mustard gas. The significance of this is that it not only had a more extensive and persistent effect, but instead of killing put men out of

action for a time: a time long enough for the issue of a battle, or even a war, to be decided before they were fit again. The possibility of contaminating large areas with this blistering substance, and the fact that its effect does not develop until some hours after contact, make it as potent morally as physically, for no man, having passed through a contaminated area, knows whether he has not accidentally got a smear on his hands or clothing which will presently give rise to the dreaded blisters. Uneasiness is all the greater, because one affected man may 'infect' dozens of others before it is even known that he is affected. Truly, mustard gas is a modern chemical form of measles.

If it is too much to expect that the warning will be heeded, the possible use of mustard gas in another war is another hindrance to the use of armies composed of infantry, for to be secure against it an infantryman must wear not a respirator but a complete diver's suit, in which movement would be impossible. And if a man cannot move he cannot fight, except sitting in a trench. Mechanization is the only solution. For to infantry armies, a stretch of country sprayed with mustard gas will be as complete a barrier as barbed wire has been to the infantry unit. Only in tanks and similarly protected vehicles will man be able to manœuvre freely in a theatre of war where gas is employed.

A more truly original and plausible suggestion is that war will be waged by suggestion—by words and not by weapons, propaganda replacing the projectile. This idea, indeed, is already a part of one national theory of war. Lenin crystallized it in his neo-Napoleonic maxim that 'the soundest strategy in war is to postpone operations until the moral disintegration of the enemy renders the delivery of the mortal blow both possible and easy'. In other words, just as an artillery bombardment was used in the last war to smash the enemy's barbed wire and trenches before the infantry advanced, so a moral bombardment is to be used in the next. It has even been tried already, in

China, and with flattering success. But all nations are not as susceptible as the Chinese. And we should do well to remember that even in the hungry and war-weary Germany of 1918 the bombardment of 'talkie-shells', manufactured by President Wilson and fired by Lord Northcliffe, lost most of its 1917 effect when the German armies began to break through the allied defences in France, and did not regain its effect until those armies began in turn to be driven back.

This reflection leads us to the definite question, what will be the future trend of land armaments? The army which has gone furthest to answer it has been the British. The other armies, save the German, have marked time at the point where they left off the war, or have already slipped back a year or two. The German Army, converted unwillingly into a small professional army, has as rapidly acquired a new faith, that of the superiority of such an army, highly trained and mobile, over the unwieldy masses of a conscript army. In its standard of training the new German Army has lived up to this ideal, but the terms of the Peace Treaty forbade it the tanks and other machines which are the natural complement to this ideal. The British Army, after beginning its post-war career with a cry of 'Back to 1914', has actually advanced some way along the road signposted in 1918. It was the first to be equipped with high-speed tanks, the first to use tanks independently of infantry, the first to adopt six-wheeled cross-country transport; it formed the first completely mechanized force, and issued the first official manual of mechanized warfare. Even so, its practice has not kept pace with its theory. Its mechanized units, if modern in idea, are undeveloped in figure, and it has done nothing yet to rid itself of its adipose tissue of infantry. Its leaders put off the fateful decision by continuing experiments which have already yielded all the proof that is possible.

Yet the British Army has at least more excuse than

others for obsolescence. Whilst the majority of other armies are trained essentially for war, the British Army is primarily a force for policing the Empire. And the Briton abroad, more responsive to traditional instinct than to reason, still finds more comfort in the visible presence of khaki-clad guards scattered about the country than in the potential appearance of armour-clad machines that can be switched swiftly to the scene of an outbreak. It is this demand for infantry as policemen which at present hinders the British Army from being modernized in the way that its leaders now realize is essential for any future war.

This modernization is likely to take two forms, which are to some extent successive stages. The first is *motorization*; the second true *mechanization*—the use of armoured fighting vehicles instead of unprotected men fighting on foot or horseback. Motorization has already gone far, accelerated by the advent of six-wheelers and other types of cross-country motor vehicle which can move off as well as on the road. If these have to be quitted in battle they at least quicken the movement of forces to the battle-fields and in strategic manœuvre. Although, with characteristic fetichism, infantry are still trained to march on their feet, laden like pack animals, military authorities now recognize that the day of such marching is past. In the British Army horses have been replaced by six-wheelers in the transport service, and for any emergency move these are utilized to carry troops. In the disturbances in Palestine the whole infantry garrison was hurriedly motorized with hired motor vehicles.

The future of *mechanization* is divided into two questions: that of the type of machine and that of organization. After the war most armies, under French influence, persevered with the heavily armoured type of tank which, being sluggish, was intended merely as a direct aid to the infantry in attack. The British, however, developed a new fast type, lightly armoured and capable of a speed of about twenty miles an hour. The fact that their high

speed was wasted, and their risk excessively increased, by tying them to the pace of the infantry, encouraged the idea of using them independently in wide outflanking manœuvres. This, in turn, led to the formation of a separate mechanized force of armoured fighting vehicles, a formation which fulfilled the conception of the prophets of mechanized warfare. Even though the force was imperfect in composition, it was certainly a unique event in military evolution that any military pioneers should see their prescription accepted within so short an interval of time.

In the last year or two, the diverging lines of French and British tank design have shown some sign of converging anew, the French giving increased speed both to their small tanks and to their super-heavy 70-ton tanks, while the British have added somewhat thicker armour, as well as a fresh increase of speed in the 30- and 16-ton tanks which have followed the original fast 11-ton tank of 1923, still their standard machine.

The French 70-ton tank, which carries armour no less than fifty-five millimetres thick, naturally suggests the idea of future land dreadnoughts. But such speculations fail to take account of the difficulties imposed by rivers, railways and other obstacles. There are few bridges which could bear so heavy a machine without collapsing. For a specialized purpose, such as that of breaking through a strongly entrenched line, this moving fortress might have value. For general utility, I doubt whether such large machines have a future. The bigger the machine the bigger the target, and on land the gun has far greater advantages in its competition with armour than at sea. It would not be easy to produce a tank with armour thick enough to resist a direct hit from modern field artillery, whilst the larger such machines become the more exposed they are to air-bombing. In any case, the high cost of these super-heavy tanks makes their development impossible, save experimentally, in peace time.

A more promising line of tank development, and, in my opinion, the trend of the future, lies in the direction of the miniature tank, built mainly from commercial motor parts, so that cheapness in peace and quantity production in case of war can be ensured. This line was initiated in England with the experimental 'one-man tanks' of 1925, invented by Martel and Carden. Since then much progress has been made, and although they now have a crew of two they are still so small and low—lower than a man's height—as to be almost invisible targets, whilst their improved performance is obtained at a cost which, according to type, varies between that of a Buick and a Rolls-Royce touring car. In mass production it would, of course, be reduced. Now fitted with a rubber-jointed track, which needs no lubrication and has practically no wear, these light tanks have made journeys at an average speed of nearly thirty miles an hour, and can attain maximum speeds fifty per cent higher. Within a few years one can foresee the advent of light tanks capable of sixty miles an hour.

America has also entered the fast-tank field with the multiple-wheeled Christie, convertible to tracks and capable of seventy miles an hour on wheels and forty on tracks. As a substitute for existing armoured cars, it has certainly good scope, but as an 'in-fighting' tank the comparatively large target it offers is a drawback, and it would seem to be rather a basis for further experiment than itself to be the tank type of the future.

There is to-day, indeed, a plethora of new types of machine, some already proved and some still experimental, but, as a whole, so advanced as to establish the fact that mechanized troops will be able to move as readily across country and over the battlefield as infantry or cavalry units could in the past, and at a much higher speed, while enjoying the protection of armour. Mechanical feet have shown their general superiority over human and animal feet. And they enable the fight-

ing man not only to use more powerful and heavier weapons but to fire while in movement.

The greater question of the future is how the transition will be made, and the structure of armies be adapted to the new form. Here the factor of expense reinforces the conservatism of the soldier in imposing a brake upon change. The army which first had the moral courage to scrap most of its old-style units and replace them by a small number of mobile armoured units would at once enjoy an immense advantage over all others. The armies of the world would be thrown into the melting-pot, and from this might emerge not only a general new pattern but a real opportunity for an agreement upon the reduction of land armaments. Soldiers perhaps suspect this, or feel it subconciously, and hence are the more dubious of change. But they are also restrained by lack of an outlook such as the modern industrialist possesses. They are willing to add the new machines to their existing forces if they had the money to do so, but are unwilling to scrap any of the old instruments, whereby alone they could obtain the money. The soldier-in-office is the Micawber of the modern world. He is always hoping for something to turn up, for some miracle of money from heaven which will rescue him from his dilemma, and allow him to buy a new outfit without selling the old.

Thus, as I see it, armies would remain as they are, growing ever more threadbare of value, with tanks a mere trimming—so long as tanks remain costly. The best chance of change lies with the development of the cheap baby tank such as the Carden. And the most likely way of change, not initially in their use as a separate arm, but in their adoption as the machine-gun carriers of the infantry. In 1929 they were introduced in two infantry brigades to replace the old horsed limbers. The result was a revolution in machine-gun tactics and in the outlook of the infantry. In these carriers, as difficult to see as to hit, the machine guns could be brought up far quicker, could

be switched from point to point, and could fire from positions far closer to the enemy, being so small and low that they could hide behind any bush or patch of gorse. But they did not merely cover the infantry attack with close-range fire. Often they would race forward to seize a hill or other point of advantage while the men on foot were still trudging laboriously towards it. Thus they became tanks, and their infantry crews, quite unconsciously, yet gleefully, became tankmen. Moreover, instead of six men being needed to serve and feed the gun, only two, a firer and a driver, were needed. The significance of this fact is that if these superfluous men had been discharged, the saving of their cost to the country in a single year would have more than paid the capital cost and upkeep of the little armoured carrier.

Once a number of these armoured carriers are provided for the machine guns of every infantry battalion, soldiers may begin to ask themselves whether eight hundred slow-moving and non-bullet-proof riflemen are necessary as well. They may feel that more machines and fewer men would give greater chances of success—besides saving men's pay in peace and widows' pensions in war. The machine gun has proved itself the dominating weapon on modern battlefields, and there is no logical reason why they should be limited to a mere sixteen per battalion now that, through armour and the petrol motor, they can take a direct part in the attack and ensure themselves an adequate supply of ammunition.

The riflemen who remain will become lightly equipped skirmishers, carried on the march in motor vehicles. The new battalion will require far less than the present man-power, while possessing much greater fire-power. Then the natural sequence is that part of these modernized infantry battalions will be converted into pure mechanized units equipped with the superior-quality light tanks. So also will the cavalry regiments.

Thus the Army, as a whole now strategically mobile,

will regroup itself into two fighting parts with separate tactical functions: one a close-fighting part, composed of semi-mechanized infantry, and the other a mobile fighting part, composed entirely of armoured fighting vehicles. The close-fighting units would be employed to clear hilly and wooded country, to gain river-crossings, to evict the enemy from villages or trench systems, to occupy strategic points, and to act as general handymen. The mobile fighting units would manœuvre widely to turn the enemy's flanks and attack his lines of supply. If they encounter an enemy in a well-prepared position bristling with anti-tank guns, their tactics will probably be to harass the inert foe by fire while they cut off his supplies of food and ammunition, until he is driven either to surrender or to expose himself in an attempt to get away. When acting in direct combination, the close-fighting part of an army would be used to pin and paralyse the opponent while the mobile fighting part would carry out a decisive manœuvre against his rear.

In nature and in function the close-fighting and mobile-fighting parts of the army would correspond to the infantry and cavalry arms of the armies of the later Roman Empire. And history may again repeat itself in the gradual absorption of the first by the second until, as in the age of Belisarius and Narses, the 'infantry' became a mere auxiliary for military scavenging and the custodianship of what had been conquered by the 'cavalry', who, in the main campaign, would merely dismount part of their men to act on foot when necessary.

As for the artillery, expert opinion is already inclining to the view that the day of and need for the existing field gun is past. Even drawn by a motor tractor it cannot keep up with the movements of a mechanized force or with the kaleidoscopic changes of a mobile action. To do this it must be mounted in a tank. But for such open fighting the present 18-pounder is unnecessarily heavy; a 3-pounder or, at most, 6-pounder gun, such as a tank

already carries, may amply suffice. And against a well-entrenched position an 18-pound shell is not heavy enough for effect, as experience showed in the last war. Hence it seems likely that the artillery of the future will comprise two main classes: first, light guns mounted in tanks and absorbed into their organization; second, heavy tractor-drawn artillery, which, like the siege engines of antiquity, will be brought up only when the enemy is found in a fortified position.

Heavy artillery has notably increased in range. While the high-velocity guns which bombarded Paris in 1918 from a range of seventy-five miles were essentially freaks, short-lived and wanting in accuracy, to-day there are super-heavy guns of more normal design and accuracy which have ranges up to thirty miles. But their utility is questionable, as their scope is limited, in view of the development of air bombers. In the factor of cost alone, of the gun and of every projectile it fires, they are at a serious disadvantage. Even to-day aircraft are the most effective and economic means of long-range bombardment. And the advent of wireless control of such machines, dispensing with the need for a costly human crew, will immensely augment their advantage.

The question of air bombardment naturally raises that of anti-aircraft artillery. Can this be an effective antidote? In the gun itself there has been a considerable improvement, so that aircraft can be effectively engaged at heights up to 20,000 feet. Still greater progress has come through the invention of such a 'magic-box' as the Vickers Predictor, whereby a combined calculation of the speed, course and height of the aeroplane is automatically made and electrically transmitted to the guns, so as to eliminate human slowness and variability in aiming. In the war only one hit was obtained for every 30,000 rounds fired. It is now claimed that, even at heights over 12,000 feet, the odds in favour of the aeroplane escaping when engaged by a battery are reduced

to a mere 8 to 1. But there is always a vast difference in gunnery between peace-time practice and war results. Moreover, in the very perfection of the Predictor appears to lie its antidote. For its automatic calculations are based on the normality of the aeroplane's course, and any sudden change or manœuvre is liable to upset the result completely.

Thus the most that it is safe to reckon upon is that the progress of anti-aircraft gunnery will force aircraft to fly higher, and will lead to the use of fast and small bombers rather than the relatively clumsy big bomber of the past. But this tendency is stimulated even more by the terrific speed and agility of the latest fighters, attaining over 200 miles an hour. These, like mosquitos, can sting to death the mammoths of the air. Their speed, however, is matched by the modern 'day bomber' as it is called. This carries a bomb-load of 500 lb. and can carry more; its possibilities of long-range destruction can be realized by comparison with the fact that the 'Paris gun' only fired a shell of 265 lb.

Difficult targets as such bombers would be to anti-aircraft guns when flying high, they can make themselves an impossible target by flying low. If, for example, an enemy air force was attacking depots, docks or arsenals near a city, it is likely that the bombers would come in low from all directions, skimming the roof-tops at tremendous speed—a method that would not only give them immunity but enable them to lay their 'eggs' with deadly accuracy. We have only to think of the far-spread environs of London or New York, for example, to realize the difficulty of placing machine guns, and enough machine guns, where they could open fire in time to catch such roof-skimming invaders.

Further, these factors of air superiority over any known counter-means increase with every increase of air speed, which makes gunnery calculations more difficult and more liable to error. And they do not take account of

the weather conditions which the aeroplane can convert into a cloak for itself. It is specially significant that night and cloudy weather are the most favourable conditions not merely for concealment but for the use of gas. For then its persistency is greatest.

To estimate the duration of the change of armies to a mechanized form is impossible. But one prediction is safe: that the longer it takes, the more subsidiary will become the rôle of the army itself. The reason is that this transition is a replica within the army of a greater one in process outside, and the greater will exercise an increasing influence on the less. For the air appears destined to be to armies what mechanized forces are to infantry.

Military organization at its several peaks in history has been based on the combination of a defensive pivot and mobile offensive wings. The first afforded the stability from which the decisive mobility of the second could be developed most effectively and securely. Thus did Alexander, Hannibal, Scipio, Marlborough and Frederick achieve their triumphs. The fact that the pivot was stable did not imply that it lacked offensive power or mobility—in fact, Alexander's phalanx, Scipio's legion, and Frederick's Prussian foot possessed both—but only that it possessed these qualities in lower degree than the cavalry which struck the decisive blow.

To-day the respective qualities of armies and air forces suggest a striking parallel. Even the word 'wings' emphasizes it. Armies have immense defensive stability by virtue of the machine gun, but have lost both their mobility and offensive power. Mechanization will restore these qualities in considerable degree, will raise armies that adopt it to the level of the Macedonian phalanx and the Roman legion. If they do not adopt it they will be relegated, like the infantry of the Middle Ages, to the subordinate and passive rôle of mere garrison troops.

The wider rôle of mobility and offensive power lies in the air. And the air force appears to be cast for the decisive rôle, as the heirs of Alexander's 'Companion' cavalry. Thus, as of old the forces of a nation for war on land were thought of in terms of infantry and cavalry, though each had its several subdivisions, so in the future we need to think of the army and the air force as the two main components of military power.

In one country at least this conception has already taken hold. Among Italy's present leaders are acute minds who, in reviving the Roman tradition, have remembered the fact that Roman statesmen understood war as well as politics. In discussion with them I have felt that they now regard the army as the holding force and the air as the striking force, and that in case of war the former would act as a secure springboard, gradually pushed forward, from which the latter can jump—over the enemy's natural and artificial defences, the mountains and fortified lines.

In Italy's case, geography is a spur to this new theory of war. The mountain barriers astride most of her possible theatres of war would be a hindrance to her army in gaining a decision, and would also limit her scope for the use of mechanized forces. With other armies, likely to operate in more open theatres, there would be greater scope for the offensive so long as they were mechanized. An unmechanized army will, as in the immediate past, be incapable of advancing in face of machine guns, and will become a target for hostile air attack. The larger it is the easier it will be to starve by air bombardment of its lines and depots of supply. But mechanized forces, advancing by rapid bounds, may themselves find a target in the enemy's aerodromes. By attack on these they may cripple the enemy's air offensive, or at least force it to be carried on from bases farther back, thus diminishing its effect. They may, further, gain control of the enemy's aircraft or munition factories, or of the sources of raw materials

upon which the maintenance of both his military effort and national life depend. For these economic resources rather than the armed forces may be the real point of aim in another war, and the latter only an obstacle to be overcome if it cannot be evaded on the way to the economic goal. This reflection does not imply that civil resources, still less the terrorization of the people, will be the deliberate military aim at the outset of another war. Fear of neutral opinion is likely to be too strong a deterrent, and will be reinforced by military habit. But it will be no longer possible to draw a clear distinction between military and civil objectives. This distinction in the past has rested far less on a legal definition than on the simple physical fact that the enemy's army was in the way, and afforded a shield to the country behind. Now air forces can jump off this shield and mechanized forces can slip round it.

Munition centres are justifiable military targets, and they are usually in industrial areas. Railways are used to carry troops, and so they also are a fair target. It would be absurd to contend that troops are only open to attack when in a geographical zone popularly called 'the front'. They train and assemble in camps at home, travel by road and railway, passing through cities, and although they were usually immune before aircraft were invented they cannot claim immunity. Thus the infliction of military and civil damage, material and moral, will coincide. Again, ports are justifiable targets because warships and troops sail from them, and it will be a fortunate coincidence for the enemy that food supplies also enter by them. Thereby, with more assurance and less risk of odium, the flow of seaborne commerce may be cut off at its source instead of in transit. With an island state the screw of starvation could easily be put on the will of the people to induce surrender.

In this future warfare, economic in aim, the air is likely to be the dominant partner. If the sea spaces are wide, navies will play their traditional part, although increas-

ingly 'aerated'. Armies, in so far as they are mechanized, may co-operate profitably, otherwise they will be a mere auxiliary or an expensive encumbrance. Surveying the course of history, one cannot be hopeful that they will adapt themselves to the changed conditions of warfare in time, for armies have to overcome their own inertia of conservatism, whereas the air force has begun its career with the immense psychological advantage that it is a mechanized force.

CHAPTER VII

AIR AND EMPIRE

THE HISTORY OF AIR CONTROL

A question of the greatest national and Imperial importance is how far we can apply new means, and especially the new mobility, to an old task—that of maintaining the Pax Britannica. And how far, by the use of air control, we can fulfil this unrelaxed responsibility with greater economy and greater efficiency. The growing importance of the question has been matched, curiously, by a growing hesitation to attempt an answer.

Whilst there is an occasional hint of long-drawn-out inquiries by a Cabinet Committee, the last noteworthy 'airing' of the question was in 1930, when a debate in the House of Lords followed upon an earlier discussion on the Estimates in the other House. It would be useless to pretend that the debate impressed the public. Instead of logical argument there was too evidently an unyielding determination to maintain sectional service interests without regard to the general interests of the country. The silky politeness of the phrases seemed more than usually hollow. They rather emphasized than veiled the spiteful undertone, and sounded disagreeably like the 'catty' interchanges of the proverbial feminine tea party.

The very abstractness of the arguments at least created a thirst for practical and historical data. It thus inspired one to turn aside from theorizing and to search for facts. After all, air control had been in regular use for ten years in the Middle East, and in occasional use there and elsewhere for still longer. One ought at least to be able to

gather materials for a judgment. And it was better to do this than to attempt a judgment itself on such vague and conflicting views as have been uttered in public speeches. With this purpose, and an open mind, I have searched official despatches—published but buried from the public by the weight of their own wearisome mass of detail—and technical journals for data, as well as gleaning the experience of officers of the various services who have been in frontier areas where aircraft have been employed.

A brief outline of the record thus collated may prove instructive to a public which has not so much been kept in the dark as left in the dark.

One finds with some surprise that aircraft were employed, and with significant results, on the frontier of India as long ago as 1917. And in that familiar cesspool of trouble, Waziristan. The small number of aircraft available certainly enhances the verdict of the military commander, General Beynon, in his despatch:

'The results more than justified anticipations. . . . At the subsequent peace jirga the Mahsuds openly admitted that the air was much dreaded, being a form of application of power by Government which they were powerless to contend with . . . it has probably opened up a new chapter in our relations with trans-frontier tribes and in our methods of ensuring tranquillity on the border.'

One reflection aroused by reading this despatch is that of the contrast between the open-mindedness and vision shown by General Beynon and the attitude in the 1930 debate. Is it because the presence of danger banished prejudice, or because the air was not then viewed as a dangerous rival service?

In 1919 a greater danger arose—the triple combination of internal disorder, tribal menaces on the Waziristan frontier and the third Afghan War. When it loomed up there were only two air squadrons, with obsolete machines, in India. This weakness reflects rather badly on the Indian authorities' assimilation of General Beynon's

verdict. Four more squadrons were hurriedly sent in the emergency. To counter the Afghan menace an army of about 30,000 combatant troops and an equal number of non-combatants were assembled. The available aircraft seem to have been used mainly as eyes to the army, but a few were used for bombing Jalalabad and Afghan transport. But on May 24 one machine flew over the mountains and bombed Kabul. And one reads in the despatch of Sir Charles Monro, the Commander-in-Chief, 'There is little doubt that this raid was an important factor in producing a desire for peace at the headquarters of the Afghan Government.'

I have heard officers then on the frontier even declare that it was the decisive factor in bringing peace. If so, there has surely never been a more dramatic instance of one-man effect in the history of India or of war. Napoleon's presence was said to be worth an army corps, but this aeroplane seems to have achieved more than 60,000 men did. In the light of his record in the war, no one would suggest that General Monro was anything but cautious in his judgments.

The Waziristan operations came in November 1919. Here also the available aircraft were chiefly, but not exclusively, used for close reconnaissance. In dealing with the Tochi Wazir country an interesting method was adopted. On the 10th aircraft flew over it and dropped warnings that air bombing would follow unless the tribes submitted. A military column then advanced and on the 17th met the jirga. But parleys proved barren until, two days later, seventeen aeroplanes carried out a bombing attack. The tribal delegates wilted instantly, and our terms were accepted in their entirety that same day.

In the Mahsud country results were less satisfactory, but so also was the thoroughness of the trial. A daily bombing attack by six or seven aeroplanes was initiated, but on the third day the military authorities decided that

such bombing alone would not suffice and unleashed their ground expedition. It looks as if they jumped to the conclusion rather precipitately, the more so that one of the chief staff officers on the spot considered that the Mahsuds were hovering on the brink of submission. Moreover, the resistance to the ground advance was such that the troops suffered several thousand casualties in carrying out their task.

That same year saw the first example of peace-time air 'influence' in the Middle East. Colonel Jacob's mission in the Yemen was held prisoner at Bajil. As there were not sufficient troops available at Aden to form what the local commander considered an adequate expedition, two aeroplanes were sent as a 'first-aid' measure. After one of these had made a demonstration over Bajil the mission was instantly set free.

The next year was marked by two trials, greater in importance but carried out with means almost as tiny. One was in the Sudan against the Garjaks. Only three aeroplanes took part, but the Governor-General, Sir Lee Stack, stated in his despatch that their effect was 'immediate and decisive, and the Garjaks, recognizing to what dangers they were exposed, speedily commenced negotiations for submission'.

The other was in Somaliland, where for a generation the Mullah had defied our efforts to subdue him. When the menace rose to a head late in 1919, a force of eight aircraft, with a further four in reserve, was despatched to Berbera to co-operate with the ground forces. On January 22, the Mullah's fortified camp was attacked from the air, and after two days of this bombing the Dervish force was demoralized and dispersed. The ground troops then took up the pursuit of the Mullah's scattered men. The military officers later claimed that this pursuit was the decisive factor, and have complained that the dispersion of the Dervishes made it more difficult for them to round up the fugitives.

On the other hand, the Governor should be the best judge, and in his despatch he stated that the air detachment was the 'main instrument and decisive factor' in breaking and ending the Mullah's power. The War Minister, Mr. Churchill, stated in Parliament, also, that 'the Royal Air Force on this expedition achieved more than we were able to do in one expedition before the war at an expenditure . . . that would be £6,000,000 or £7,000,000 of the present currency'.

It seems to have been largely due to the impression made on Mr. Churchill by these practical tests, coupled with the contrast between their insignificant cost and the vast expense incurred in putting down the revolt in Iraq, that in 1922 Iraq was handed over to air control. Public outcry at the financial burden undoubtedly accelerated the transfer, when it was found that the R.A.F. 'tender' was less than half the Army figure for garrisoning the country. Thus a great experiment was initiated.

A feature, realized by few, in the history of air force, as a warden of the Empire's frontiers, is that its earliest trials and successes were on the North-West Frontier of India. Yet, apart from a trivial increase from six squadrons to eight, its share and scope in the defence of the Indian frontier has remained virtually unchanged since 1919—although in the meantime it has assumed and maintained charge of the whole Middle East.

Once realized, the contrast seems so strange that it provokes inquiry. Thus it is worth while to continue our study of air history in the land of military control before turning to the pages inscribed in the lands of air control. These pages, moreover, have relatively few, and decreasingly few, entries in the way of operations. Here is another contrast which reflects an impression on the mind of the impartial student who is seeking historical data as a guide amid the tangled undergrowth of controversy.

Despite the encouraging experiences and reports of 1917 and 1919, one finds that the slender air force of the Army

in India was allowed to decay, until by 1922 there were scarcely any serviceable machines, and the personnel were rotting through discouragement and lack of practice. When at last the scandalous conditions became public knowledge, Sir John Salmond was sent out to investigate, and to make recommendation on the whole problem of Indian air policy. His report, like others on this vexed and vital question of the air and its future, has never been disclosed. But a good many hints as to its nature, the evidence given by witnesses in India, and the views of the various authorities in India have come to public knowledge. Rather more, perhaps, from the army and political than from the air side.

Apart from an overhaul of equipment and organization, the report is known to have proposed an application of the lessons already learnt regarding tribal disturbances on the one hand, and a possible war with Afghanistan on the other.

Then, as now, the two functions were distinct. The rôle of frontier protection is fulfilled by the covering force, composed mainly of Indian troops, while the Field Army stands ready behind the frontier in case of a war with Afghanistan. It was suggested that the R.A.F. should take over the primary rôle in such a war. One argument, naturally, was the quickness with which air action could be taken, coupled with the fact that the Afghan power resides in a few nerve-centres, which are as easy to reach by air as they are difficult of access overland. It is generally estimated that six months would be required before a ground expedition could reach Kabul, whereas aircraft, as the relief operations of 1929 showed, can 'hop' over in a couple of hours.

Another argument was that air action would give us the opportunity of paralysing any menace from Afghanistan without the costly necessity of occupying the country, which is contrary to our policy, and entails tremendous risk to our forces. For the history of our expeditions last

century shows that the presence of an invading force tends to rally all the tribes against it.

The more progressive soldiers were inclined to welcome one aspect of this air proposal: that a reduction in the actual size of the Field Army would enable its equipment to be modernized—an urgent need.

As regards the other function—of normal frontier protection—the proposal is said to have been that the Air Force should be given charge of a sector of the frontier, as a trial of its merits. It is understood that General Birdwood, then responsible for the defence of the North-West Frontier, was agreeable to this trial and was willing to replace a portion of the troops by air squadrons; and that the Government of India was favourable. But the proposal broke down because the then Commander-in-Chief, Lord Rawlinson, although also agreeable to the trial, was unwilling at the time to reduce any troops to pay for the extra air squadrons, and wished to await evidence of the results of the Iraq experiment. His attitude is understandable in that air control was just being introduced in Iraq.

Thus the old system was continued. In 1923 aircraft were again used in a minor rôle in the fresh operations in Waziristan. But in 1925 they were given a real chance when an outbreak occurred in which four tribes took part. This time no ground troops were used, and the air was given definite charge of the task. After operations, lasting a little under two months, all the tribes submitted—and some other tribes in the district showed a most unusual desire to pay up their outstanding fines!

While due weight must be given to the progress of the road system, it is a significant fact that the Waziristan frontier was free from any serious trouble until 1936, a year of general frontier disturbance, and even then it was quenched quickly, and more easily than elsewhere. Air officers naturally point with pride to the fact that the brief air operations of 1925 cost less than £100,000,

whereas the military operations and garrisoning of Waziristan had incurred an expense of some £18,000,000 in the four previous years, and without ensuring peace.

The next air test came in 1927 in the Mohmand territory near the Khyber Pass. There a prophet appeared preaching a jehad against the British. The squadrons in the Peshawar district were ordered to stand by in readiness, although officers were not even recalled from leave. Then parts of three squadrons were unleashed, and within two days the rising was quelled. During that period the Air Force had carried out fifteen raids, by day and night, and dropped 450 bombs. Marked as was the effect of the bombing, the collapse of the rising seems to have been due as much to the fact that when the tribesmen, spoiling for a fight, found no one to fight and no camps to raid, their enthusiasm waned.

One may draw a close parallel between this and the 1908 rising, when the time taken to assemble a field force allowed the rising to develop, exposed outlying detachments to Mohmand raids, and entailed some severe fighting in forcing the chain of sangars which the tribesmen had built as a barricade along the frontier.

The 1908 expedition called for about 17,000 men—nearly a hundred times the size of the 1927 force; and its cost in money was roughly in the same proportion. Moreover, the 1927 operations attained their object without the loss of one life. Another point is that the 1908 concentration was marked and interrupted by an outbreak of cholera, whereas the 1927 air units operated from their ordinary stations under healthy conditions. These comparisons certainly seem to have a significance which the student cannot in honesty evade.

The condition which really influences the tribes towards peace is the dislocation, or threatened dislocation, of their normal life. Because of expense and its own difficulties of movement and supply a ground expedition cannot ensure that dislocation is kept up long enough for enduring effect.

Nor as a deterrent is it always 'in being'. The air threat is constantly on the evildoer's horizon.

The value of air-power on the Indian frontier had a new illustration in 1929 by the most 'peaceful' example of all —the evacuation by air of the European colony in Kabul. This almost certainly saved a costly relief expedition and its likelihood of embroiling us in a general war. The actual method of relief, whereby troop-carrying aircraft were switched from Iraq, as India had none—switched 2,500 miles in three days—also illustrated the 'fluidity' of air-power. Air units in one part of the Empire become a reserve for the whole because of the quickness with which they can reinforce any area where trouble arises.

The severest test of the Air Force came, however, in 1930. It was more severe than it need have been, partly because of the unduly weak strength of the Air Force in India, but also for other reasons. After all the experience acquired by the Indian authorities in thirteen years of test, the air strength in India amounted to barely a hundred machines, manned and maintained by a mere 2,000 officers and men. In contrast to this handful the Army in India totalled over 200,000 and the covering force on the frontier alone comprised some 60,000 men. Of the eight air squadrons, only six were available for the North-West Frontier; even those that were bombing squadrons in name were actually equipped with light two-seater 'general service' machines. To cover such an immense and intricate frontier with such a small packet was, and is, strategically a very thin scrape; for the personnel it obviously involves an unfair strain.

The trouble on the frontier developed in the spring, and was due above all to propaganda—and subsidies—from within the Punjab. British political officers feared, and congress agitators hoped for, a general rising among the tribes which would involve us in the largest tribal war on record—and thus draw the British troops from their task of maintaining internal order. This danger never

matured, although the trouble was spasmodic for several months. It is a clear deduction that the danger was checked by air action, for the ground troops scarcely came into action; far less was any large-scale expedition needed as in the past.

After the arrest of Abdul Ghaffar, the 'Red shirt' leader in Peshawar, his father-in-law, the Haji of Turangzai, raised the standard of revolt among the Mohmands at the end of April. A fortnight was allowed to slip away before air action against the seat of the trouble was sanctioned. The lashkar, or rebel band, was naturally a more evasive target than the villages from which they came. However, on June 5 the Haji's village was at last bombed. The insurrection at once began to weaken. On June 19 an ultimatum was sent that all the villages in the district would be liable to bombing unless the lashkar dispersed. On June 21 the Haji besought peace. When the Afridis sought to rouse the Mohmands again in October, a fresh warning sufficed to quench the danger.

An Utman Khel lashkar had also gathered late in May. Air action was taken against its villages in the Barang valley on June 16 and 17. The lashkar dispersed to its homes on the 18th. A small ground force arrived on the scene a day later, and caught a few stragglers. A few days later a jirga of certain other sections of the Utman Khel was held, but their intention of raising a lashkar was handicapped by the refusal of those who had already been bombed to let any lashkar pass through the Barang valley, for fear of further bombing. In July some fresh sections of the Utman Khel crossed the Swat River but recrossed it the day after their villages had received a second dose of bombs.

Waziristan, too, suffered from the infection of revolt. On May 11 a lashkar of Tochi Waziris, 4,000 strong, besieged the militia post at Datta Khel. Aircraft came to the aid of the garrison at once, and also dispersed a fresh lashkar that was arriving on the scene, but air action

against their villages was not unloosed until the afternoon of the 14th. That same evening the besieging lashkar heard the news and went home; submission was made next morning. The Mahsuds likewise were restless and several times lashkars gathered, only to disperse after bombing of their villages. A stronger rising occurred in July when several posts were invested. But after sustained and widespread air action, all sections of the Mahsuds had subsided and submitted by July 27. Within three weeks the danger of a serious rising had thus been quenched—and did not recur. It is difficult to determine what weight the ground forces exercised. The Razmak column certainly marched out a few miles from its base and shelled some villages in the neighbourhood that were within range. But the tribes of this wide mountain region emphatically dwelt on the influence of the air action in making their submission.

North of Waziristan in the Orakzai territory, only two small sections gave serious trouble. After three days' bombing, one section craved for peace on July 14. The air then concentrated on the other section, and on the 18th this too was ready to submit. Farther north, it took three weeks of intermittent action—but only two flights of machines—before the Chamkannis gave in.

Farther north still, the Afridis caused a much longer run of trouble—for reasons that repay examination. If they have not been as dangerous foes as the Mahsuds and Mohmands they have always been able exponents of tip-and-run tactics. And in 1930 they improved on these by adapting German brand '1918' infiltration tactics to frontier warfare. If these formed a safeguard to themselves against the air, they also proved that the frontier chain of static military posts was no safeguard, but a sieve. The test need not have occurred if the release of air action had been more timely. For the tactics were not learnt until after the first incursion.

The approach of the Afridi lashkar was watched

from the air from June 1 onwards. But not until the evening of the 4th, when they were on the outskirts of Peshawar, was the air force given permission to bomb them—and then too late to bomb them before dark! Only part of one squadron was available, and these few machines did their best in the dark. It sufficed to shake the nerves of most of the lashkar, so that only a fraction ventured across the border into the environs of Peshawar. Next day the aircraft obtained a few good targets, which is more than can be said for the slow-moving ground columns which marched to and fro in ineffectual pursuit of the elusive tribesmen. By the morning of the 6th the Afridis had set off home.

The renewal in August of their attempt on Peshawar is certainly to be traced to the moral fillip unfortunately given them by the failure to check or punish their first inroad. For their villages were not bombed.

On August 7 this second lashkar arrived on the Kajuri Plain outside Peshawar. Moving down by small parties and at night they had naturally if skilfully avoided air interference. Once more they proved too elusive for the ground columns which made stately sweeps through the district. Light tanks, if they had been available, might have been more successful, but the cavalry only succeeded in being ambushed. But at least the continued necessity for dispersion, to avoid bombing, prevented the Afridis making any concerted or serious attack on Peshawar, and on the 12th they withdrew.

But their tip-and-run achievement at least produced a concerted attack on the air force—by military and naval 'clansmen'. It was, indeed, too obviously concerted to ring true. Thus in reaction it impelled anyone who had no preconceived bias to explore the facts for himself.

To realize the tiny proportion of air strength to ground strength was sufficient, for any fair-minded student, to acquit the air force of incapacity to quench the Afridi rising. The restraints placed upon its action in this case

reinforced the conclusion. But a consideration of the problem strategically at once revealed the fallacy and illogicality of the counter-arguments. For no one would pretend that the air weapon is fitted to check an infiltrating trickle of tribal guerrillas. This is the function of ground forces; it was the function of the ground forces at Peshawar, some 20,000 strong. When they failed to prevent a much inferior force of Afridis from percolating thither, it would have been more relevant and logical to criticize them than the air force. The failure inevitably reflects either on their handling or on their organization, although in fairness to them the difficulty of countering guerrillas, too well known in military history, should be taken into account. The real lesson of 1930 was an old lesson repeated—the helplessness of static posts and low-mobility troops to cope with a mobile antagonist.

In contrast, the real military value of air-power, a weapon of super-mobility, is that it may disperse at the shortest notice and longest distance a foe who gathers—and whenever he gathers—for a serious attack. Its real political value is that it may prevent the great mass of tribesmen who have some property to lose from joining the reckless few who have nothing to lose. The tribesmen have never been restrained by fear of death—for they love a fight. And their incentive is the hope of seizing someone else's property, as the chief deterrent is the fear of losing their own. A trickle of raiders may cause trouble, but can be dammed—unlike a general rising. By this test 1930 was a remarkable vindication for air-power. For the most serious and widespread frontier trouble for many years never came to a head, and subsided after far less expenditure of force and money than many lesser risings had caused in the past. The reason for the difference would clearly seem to lie in a new reason—that an Imperial fire brigade had been added to the Imperial police. But with the passing of the danger silence as well as tranquillity was restored—such a silence that those who in the summer

had vehemently denounced the ineffectiveness of the fire-brigade omitted to retract what they had said.

Early in March 1932 fresh trouble threatened on the North-West Frontier, from two sources—one the old Mohmand danger spot and the other from a lashkar in the Bajaur valley. Despite a long spell of torrential rains which blotted out the hills, air squadrons took off in the intervals and bombed the sources of trouble. The Haji of Turangzai had made his headquarters beside a mosque. The precaution proved valueless as the aircraft 'wiped out his house without touching the mosque'. According to *The Times* of March 14—'the threat of concerted tribal action, which caused the gravest concern here a few days ago, has receded for the moment. . . . It is generally conceded that this sudden change for the better is due to the firm policy of striking hard and early. The R.A.F. has certainly made its best showing in recent history on the frontier. The turning point was the bombing of a lashkar to the north-west of Shabkadar. . . . Raids were carried out by flights of three machines, leaving Peshawar, Kohat and Risalpur at half-hourly intervals.' Two days later *The Times* reported that 'As a result of the action taken by the Royal Air Force all the hostile Bajaur and Shamozai concentrations had dispersed . . . to-day's news shows that the Air Force has temporarily stopped, and probably actually won, the war before the tribes were able to unite.' Probability soon became certainty. Another potential war had been erased from the scroll of frontier history.

When one turns to study the dozen years' history of air control in Iraq, the chief feature seems to be its featurelessness. This does not mean that there have not been frequent threats of trouble, internal or on the frontiers, and abundant alarms due to the appearance of raiding bands from the desert. But when one goes through the roll

of them they rarely seem to reach a pitch at which they are worth quoting. Instead, time after time the trouble disperses just as it begins to look as if it would be interesting to study.

As revealed in these records, the action of the air seems akin to, but more certain than, the application of radium to a cancer. That at least is the impression one gets. In the majority of cases a mere demonstration suffices—it does not seem as if the Air Force can have had to spend much money on bombs.

The most serious external menace was the Turkish encroachment in 1922–23 in Northern Iraq. The Turks were evicted by a combination of air and ground action. This brings me to another impression. Even in the minor operations of later years combined action seems to have been more frequent than air action alone. But the ground forces have been light in numbers and transport compared with the old-time punitive expedition—often merely a few armoured cars.

One is struck with the way that, although few, they have been able to move with impunity under the shadowing wings of their own aircraft. The air has made an attack and the ground detachment has walked in to receive a tame surrender. But, throughout, air has played the primary rôle. It recalls the combination of artillery and tanks with infantry in the last war, but with the difference that the numbers of the ground troops are less and their losses lighter in proportion.

One of the most interesting examples occurred, not in Iraq, but in Kordofan. There, in December 1929, a revolting band of Nuba tribesmen established themselves in a strong hill-position, and defied efforts to subdue them. To save the loss involved in an assault, a call was sent for aircraft. After a bombardment by five machines, the Nubas surrendered, and their position was occupied by the infantry under cover of the air 'wings'. That power of air support was shown on a larger scale in 1932, when

an Iraqi Army column tried to occupy the Barzan area, in the Kurdish mountains north-east of Mosul. The column was surrounded by the tribesmen and lost most of its baggage and supplies. From this perilous situation it was rescued by the Royal Air Force which, during the next two days, dropped fresh supplies like manna from the sky, and on the third dispersed the tribesmen with bombs and machine-gun fire, thus clearing a path by which the column could retreat. When operations were resumed, the task of subduing the more remote districts was taken over by the Royal Air Force, whose systematic pressure compelled Shaikh Ahmed's forces to evacuate one position after another, each being then occupied by the Iraqi Army. Within a month all opposition collapsed; Shaikh Ahmed himself, penned into a mere strip of his territory, crossed the frontier and surrendered to the Turks.

The military history of Iraq during these twelve years can really be better expressed in figures than in fights—in the reduction of the annual military expenditure from £20,000,000 to barely £1,200,000.

It is fair to point out that the £20,000,000 in Iraq was incurred in the year following the 1920 rebellion, and could probably have been halved if the Army had remained in charge of Iraq. But it is also right to mention that the Commander-in-Chief, General Sir Aylmer Haldane, said later that if in 1920 he had realized the power of the air he could have nipped the rebellion in the bud with aircraft alone. One of the most notable effects of the air in Iraq has certainly been the way it has converted incredulous authorities. Both General Haldane and Sir Percy Cox, the first High Commissioner, were opposed to its adoption, while many military and political officers prophesied sure disaster.

It is worth while to turn up the reports on the administration of Iraq. One finds that Sir Percy Cox, originally sceptical towards air control, came after trial to the conclusion that:

'In every instance air action was only necessary on a surprisingly limited scale. Had it been necessary to exact obedience by the employment of ground troops, the cost in time and money, if not also in lives, would have been immensely greater. A further consideration which is very pronounced in dealing with lawlessness, particularly among the Euphrates tribes, is the entire elimination, in the case of air action, of provocative effect. Past history has proved that the presence of ground troops in these districts serves as a focus for concentrating rebellious action by the tribes, while any small success on the part of the latter may magnify a minor disturbance into a serious rising. . . . These dangers are altogether avoided by the use of air action.'

Equally notable has been the published testimony of the last High Commissioner, Sir Henry Dobbs, whose verdict on the pacifying power of the air gains increased significance from his having previously held high political office on the frontier of India.

The contrast between old and new from the administrator's point of view was vividly summed up in the Government Report on the Administration of Iraq published in 1925:

'During the whole period under review, a main factor in the pacification of the country has been the Royal Air Force. By prompt demonstrations on the first sign of trouble, carried out over any area affected, however distant, tribal insubordination has been calmed before it could grow dangerous, and there has been an immense saving of blood and treasure to the British and Iraq Governments.

'In earlier times punitive columns would have had to struggle towards their objectives across deserts or through difficult defiles, compelled by the necessities of their preparations and marches to give time for their opponents to gain strength. But now, almost before the would-be rebel has formulated his plans, the droning of the aero-

planes is heard overhead, and in the majority of cases their mere appearance is enough.'

It is not often that a sober official report is so graphic or becomes so lyrical.

Internal riots in cities or thickly populated areas are, of course, a different question—as the Palestine troubles showed. For rioters who are British subjects know that they cannot be singled out from the air like open rebels or hostile raiders, and that the British power will be reluctant to risk punishing the guiltless with the guilty. But one may presume, from the practice in Iraq, that even the most air-minded officers appreciate the need for a proportion of ground troops. Even so, it should not be overlooked that back in 1921, when Palestine had a garrison of some 13,000 ground troops, there had been widespread riots, involving several hundred casualties among the population. The real lesson of Palestine seems to have been the need for adequate police.

The last extension of air control was at Aden in 1928. This also illustrated combined action, though in a different and cheaper form. The Imam of the Yemen had encroached into the Dala area of our protectorate until his outposts were only fifty miles from Aden. He had a regular army of about 6,000 men, trained by Turkish ex-officers, and an irregular force of at least double that strength. The opportunity of the air came once again from the restrictions of economy. For the Army authorities estimated that to turn out the Imam a whole division would be needed, with all its ancillary services, involving an expenditure of £6,000,000 to £10,000,000. As this outlay could not be faced, the air 'tender' was accepted and the control of Aden transferred to a single air squadron.

The first step was that aircraft dropped warnings. The Imam took no notice, and his forces, several thousand

strong, threatened a fresh advance. It was nipped in the bud. A week's bombing, in repeated doses, of the Imam's frontier garrisons not only quenched their thirst for expansion, but emboldened the nervous tribesmen in our own protectorate to join in the counter-offensive.

So, in the second week, the bombing was turned partly on to the towns in the Yemen itself. Dhamar, 150 miles distant across the mountains, was attacked, and hits scored on the barracks. In the third week the weather was bad, and the bombing was again concentrated on the frontier garrisons. The defenders sought refuge in dugouts, but their refuge became a prison. For, while the aeroplanes kept them there by bombing, our own tribesmen plucked up courage to attack the fort.

As a result the Imam's troops were driven out of Dala and retired back across the frontier. After a pause the remaining garrisons in the Kataba area were treated similarly. The panic and disruption of normal life caused by the bombing, slight as it had been, in the Yemen itself, led the Imam and his people to lose all further taste for occupying foreign territory, so the ruler of two million people submitted to the rebuke administered by twelve aeroplanes—at a cost to us of £8,500, apart from the loss of one aeroplane in an accident.

By all reports the decisive moral factor was the certainty of punishment coupled with the inability to retaliate—it quite spoilt the enjoyment of a war. When in 1931 there was a fresh encroachment into the protectorate by Zeidi tribesmen, an ultimatum to the Imam, which threatened air action, led to a prompt withdrawal of the invaders.

Within the protectorate itself, the change of habits seems to have been equally notable, especially among the Subehi tribesmen, the Pathans of Southern Arabia, who had been a predatory nuisance for generations. Unsuccessfully bribed to keep the peace, they had gone unpunished when they broke it—owing to their inaccessibility.

But with the coming of the air forces of law and order they found that 'their barriers of desert and mountain had melted away'. After warnings, bombing began on January 30, 1929. The tribesmen promptly retired into the mountains with their flocks, and in safety watched their villages being destroyed. The bombing continued at intervals like cold rain showers. By March 5 the tribesmen had grown chilled, and sent in a peace deputation, saying 'Tell us what to do to stop this calamity which has befallen us.' By March 27 they had fulfilled all the Resident's demands.

After three years had passed some of the Subehi indulged in a raid on a caravan. The surrender of the raiders was demanded and a fine inflicted. A mere warning of air action sufficed to procure fulfilment of the terms.

In the following year the Subehi in turn were the beneficiaries of this power, after they had been raided by tribesmen from the Yemen, who carried away prisoners and animals. Owing to the Geneva proposal to abolish air bombing, there was delay in obtaining sanction for action against the intruders and, while the departments were still arguing the matter, a fresh raid took place. Thereupon, action having been approved, the mere threat of it sufficed to ensure that the captives were promptly set free, the property restored, and the hostile forces withdrawn from our territory.

The new air arm of the law made itself felt in yet another way when, early in 1934, the Imam lifted his embargo on trade between the Yemen and Aden. The prospects of this peaceful intercourse were temporarily imperilled by the disposition of some of the Aden tribesmen to raid the Yemeni caravans. They had to be taught that the law was impartial and 'international'; that its arm was extended for the security of all who came peacefully disposed, not merely for their own defence when attacked. As the Quteibi tribesmen, long sustained in their proud indepen-

dence by the mountainous country they occupied, were not disposed to admit the change wrought by new conditions, the importance of good order was impressed upon them by sustained disturbance of their normal life. The use of their villages and fields was denied to them by night as well as by day, although this meant constant flying over country where any successful forced landing would have been impossible. After a few weeks the Quteibis grew tired of the experience, and gave in, handing over hostages for future good behaviour.

My purpose in this survey has been to set out historical facts, and only to draw historical conclusions. But I will venture one reflection. I can understand the point of view of those who insist on the need for air officers being in higher charge if aircraft are not to be misapplied or frittered away on secondary tasks. It is only too clear that the history of the past eighteen years yields support to their contention.

But I see also the natural point of view of the soldiers and sailors. Few of us can be impartial when our livelihood is threatened. Whilst I have found that the claims of responsible air officers are far more conservative than the predictions of scientists—I have never heard them claim that the Air Force could replace the older Services in many of the spheres of Imperial defence—it is true that every extension of air responsibility must mean some limitation of soldiers' and sailors' opportunity. Their future is a narrowing horizon. Little wonder that they are unwilling to agree publicly to what they often admit privately.

Unless every advisable change and advance is to be resisted, ditch by ditch, a fresh opening must be created. Nor can the country afford that the good brains in any Service should be shut out from her service. The one practical way out of the impasse would seem to lie in

the creation, in some form, of a combined General Staff, to which officers of any Service might aspire if they have a real knowledge of the others. In the Imperial Defence College, now in its ninth year of life, lies the natural nucleus of such a staff. But this experience should be extended by attachment, for no one can be trusted to exploit the potentialities of the air who is not air-minded.

With curious unanimity, the objection to air-power as an agent of the Pax Britannica has in recent years been shifted to the ground of humanity. It carries the opponents of the air, by retreat, into the moral line. Superficially, it is a strong line, even though the cynic may find a certain humour in the fact that some of these same upholders of humanity base themselves upon effectiveness when they consider the question of the death penalty in a citizen army or of opening fire on a riotous crowd. In these cases the general interest must take precedence of the individual's. You cannot, they argue, discriminate between innocent and guilty in a crowd of fellow-subjects which does not disperse after being warned. But you must, they would seem to argue, discriminate in dealing with a band of savage marauders who are harassing and murdering our own people. A curious scale of values! Yet to such depths of illogicality are we led by the argument that, whatever the cost, we must 'punish only the actual culprit'.

I am not surprised that opinion has been impressed by the weighty verdict of distinguished Peers that air control was 'stirring up feelings of bitter hate and resentment'. I was also impressed; so impressed that I sought to find out what were the feelings of those who had actually suffered this bombardment from the air. The lofty peak of high office in past time and a different country seemed rather too remote for clear perception of a humble tribesman's mind. So I applied to a man who has lived among the

Arabs, one whose intimate knowledge of their ways and thoughts is universally recognized. What was their reaction to air action? Here is his answer.

'They feel our own intense irritation and vain rage at an attack to which there can be no response. There is something cold, chilling, impersonally fateful about air bombing. It is not punishment, but a misfortune from heaven striking the community. The R.A.F. recognizes this, and bombs only after twenty-four hours' notice given. So the damage falls only on immovables. It is, of course, infinitely more merciful than police or military action, as hardly anyone is ever killed.'

If the answer disposes of the suggestion that the Arabs resent the inhumanity of air bombing, it may seem at first sight to imply that slightness of killing means slightness of effect. But in reality the risk of death is too habitual, and so less feared than the certain destruction of property—the immovables. Pillage loses its attraction when it entails more loss than gain.

It is curious that none of the eminent military and naval Peers should have shown themselves aware that only a few years ago the Government of India made an exhaustive examination of the moral aspects of air control, and took the fullest evidence from experienced political and frontier officers on the spot. An inquiry so wide soon becomes known; the existence of this was certainly known to many people in touch with Indian circles. One would have thought that anyone recently holding such high official position as the speakers in the Lords Debate would have been aware of its findings.

According to report, this inquiry established clearly that air operations left no special 'legacy of hatred' as had been alleged; that they caused no more rancour than ground operations. Indeed, rather less, because air retribution is regarded as impersonal, whereas defeat by ground troops is a sting to pride, a stigma which must be washed out in blood. On the question of humanity one

gathers that the result of the inquiry was even more emphatically in favour of the air. First, because of the reduced bloodshed and shortened course of operations. Second, and still more significant, because the use of aircraft had brought the political officers into far more intimate touch with the tribes than ever before, so that they were able to put their finger on the seat of trouble, and, if force was necessary, could direct it against a particular village instead of against a whole valley. Thus the air has actually introduced greater discrimination into punitive operations.

If this be the conclusive result of the inquiry into the charges of inhumanity and of the feeling said thereby to be created on the Indian frontier, are there still any other complaints that require sifting? Yes, Ibn Saud at one time made a protest against the inhumanity of air action. The best comment on his protest is that, after further observation and reflection, he applied for British aircraft and pilots for his own use! It would seem that the source of his concern was not with the humanity but with the potency of air control. He has now formed a small air force of his own.

Where the services disagree, one prefers to rely on the verdict of the political officer. For he, above all, is concerned with the peace and contentment of the district entrusted to his care, and would not sanction any form of action which he knows to be inhumane in practice or likely to leave extra bitterness in its wake. For him it is not a question of 'Bomb Law'—or of 'Gun Law'—but of which means will maintain peace with the least need of force, or restore peace with the least suffering to the community as a whole. He is 'conservative' not only by habit but in vocation, and a tendency on his part to favour a progressive instrument is thus the stronger testimony to its value as a preservative of peace.

PART THREE

CHAPTER VIII

THE ARMIES OF THE WORLD

For several years past the world has been talking of disarmament, and schemes have been ceaselessly aired. Most of the talk has missed the real point and most of the schemes have taken the wrong turning—into an arithmetical lane that has no ending. We have come to doubt the old maxim—'if you wish for peace, prepare for war'. But we have still to learn a new and truer maxim—'if you wish for peace, understand war'. Ignorance means the disarmament of the peace-seeking statesmen and public, rendering them impotent in times of crisis to combat war-like arguments. The several national collections of documents on the origins of the war show how often an impulse to preserve peace was paralysed by so-called 'military reasons'—that could have been demolished by anyone who combined desire for peace with a penetrating knowledge of war. There lies the tragedy, the tragedy which pacifism of the proverbial ostrich type has always invited, and still invites.

But to-day it has also an aspect of comedy. For there is a delicious unanimity between pacifist and militarist in misunderstanding the actual strength of the world's armies. Owing to the multiplication of automatic small arms and the diminution of heavier weapons—artillery and tanks—since the war, none of the armies possess the offensive power that the one imagines and the other assumes.

But it is easier to deduce their present offensive decrepitude than to assess their comparative state. Comparison between them is a task as difficult as it is invidious,

because of fundamental differences between them in such matters as form of service, organization, armament, and function.

Because of these differences, any arithmetical scheme of disarmament is a house built on sand. It lacks solidity and gives a dubious assurance. The parallel does not end there. Sand is an obstacle to progress—these differences are the first obstacle met in any step towards the limitation of armies. Sand is difficult to grasp—so is any comparison of military values. Differences are not only a source of distraction, but a convenience to deception. Even for those who desire to be honest it is difficult amid such shifting sands to avoid self-deception.

Let me illustrate the difficulties of comparison. There is, first of all, the form of service. How can we assign values to a long-service professional army and to a short-service conscript army respectively? The most we can do is to draw broad conclusions.

A professional army may be reckoned as ready for instant action and as better trained. The importance of training has increased with the elaboration and mechanization of modern warfare, but, on the other hand, it is not so purely military. Thus a civil technician, of many kinds, may have an increased military value and adaptability. This fact benefits the country with a conscript army according to its industrial development. Again, the latter can expand its strength far more, and far more rapidly. Classes of conscripts who have completed their 'active' service within recent years, and are receiving annual refreshers, can take the field efficiently almost at once. We have only to remember what a vital part the German reservists played in the first advance into France in 1914. In contrast, a long-service army has only a small number of reserves to draw upon, and months must elapse before emergency levies can be raised and trained. Here is the crux of the question of whether trained reserves should be counted in calculating a country's armed forces.

But this difficulty of comparing numbers has now a worse one underlying it. The whole trend of modern war has depreciated the value of men compared with the value of their weapons. In the last war we saw how small German forces could make rings round the Russian masses. And even on the Western Front, where the actual weapons were more equally distributed, one resolutely handled and skilfully placed machine gun repeatedly stopped and pulverized many times its own number of men. But we cannot deduce from this experience any ratio of comparison. For sometimes it might stop a platoon of 40 men; another time a company of 200 men; a battalion of 800–1,000 men; even a regiment or brigade of 3,000-odd. All we can be sure is that an army amply equipped with machine guns is far superior in defence to an army poorly equipped and can be relied on to check the advance of an army much superior in numbers.

What about offence? Here the machine gun, in itself, has a much-reduced value. Any invasion, save in mountainous country, will depend for success on the quantity of heavy guns and tanks. These, indeed, are the only forms of force which make an advance possible under modern conditions against an up-to-date opponent.

A factor which will have an important bearing is the length of frontier open to attack and the extent to which it is fortified. This brings us to the problem of estimating what may be called geographical assets. The nations are unlikely to find an agreed basis of comparison on this point, yet it is vital to any real comparison of strength.

Allied to it is another difficulty. A nation with distant dependencies may justly claim to subtract their garrisons from its home forces. Yet how can anyone determine in advance whether a proportion, and what proportion, of those garrisons could be used to swell the home forces? So much would depend on the local situation at the moment. So much, also, on whether the main enemy could threaten these dependencies or the sea routes run-

ning home from them. The possession of such garrisons may contribute directly, and does to some extent contribute indirectly, to the real strength of the home forces. On the other hand, circumstances such as a local rising or minor war are apt to cause a drain upon the home forces even. Overseas garrisons may as likely prove a debit as an asset.

Such considerations have all to be borne in mind if we want to get anywhere near true values in tabulating the strength of the world's armies. Pacifist or publicist with a single-track mind may choose to ignore these now. But he will soon find he is overrunning the red light—when national delegations begin to discuss disarmament. The only effective pacifist is the practical one.

At present man-power remains, despite its fallacies, the primary method of registering the strength of armies. In the particulars that are submitted by the various countries to the League of Nations, this man-power is given in terms of the 'average daily number of effectives during the year'. How do the countries compare on this basis?

Let us take first the only three Great Powers that rely on voluntarily enlisted long-service armies (and for simplicity give them to the nearest thousand):

Germany	(nominally)	100,000
Great Britain		137,000
U.S.A.		136,000

In Germany's case it may be assumed that she has now fulfilled the plan for raising the Reichswehr to 300,000, with reserves of at least double the strength. Moreover, her strength is entirely present in the home country. But Great Britain has 30,000 stationed overseas in Egypt and the Sudan, Malta, Gibraltar, Malaya, China, and seven other smaller garrisons. The large number of such garrisons naturally makes them a potential drain on, rather than an addition to, the home force. From the U.S.A. total 22,000 are devoted to garrison the Philippines and

the Panama Canal Zone. A further 15,000 should be deducted as personnel of the U.S. Army Air Corps—America having no separate Air Force.

All three armies, by virtue of their equipment and training, may be regarded as having a high defensive value. But their offensive value, for European war, is limited—in Germany's case, owing to the check on heavy guns and tanks imposed by the Versailles Treaty; in the other two cases, owing to slowness in modernizing their equipment. The popular view of 'Britain's Mechanized Army' is a delusion. There has been much activity of thought and experiment—due, in great measure, to General Fuller's fertilizing ideas—but little has yet been done to apply it by re-equipping the Army as a whole. The American Army made still less progress until it received, last year, a special grant from the Public Works Administration.

As regards auxiliary forces which might supplement the Regular Army some time after mobilization, Great Britain has the Territorial Army and Supplementary Reserve, which together total 152,000. The United States has a National Guard of 186,000 and Organized Reserves of 118,000—of the latter all except 5,000 are officers. The explanation of this peculiarity is that the United States, under the National Defence Act of 1920, contemplates raising anew an army of several million men in case of war, and to this end maintains the framework in peace. The Regular Army is largely devoted to the task of building this framework, to the detriment of its readiness for action on its own. Whether such an 'army of millions' conception is suitable to any of the military problems on America's horizon is a question now being raised by critics there.

As regards Germany, the auxiliary forces that could be drawn upon in case of mobilization include the S.S., the Labour Corps—whose military value is well spoken of—and the S.A.—of which the reverse is reported. A significant addition is the Nazi Motor Corps, said to be 100,000

strong. Also, some 70,000 of the Schutzpolizei might be made available. The progress of re-equipment with modern weapons can only be gauged from the proportion of the military budget devoted to material. Even in 1931, this was half as much again as our own Army spent, and last year the whole military budget was nearly fifty per cent higher than in 1931.

Let us now turn to the conscript armies. Taking those whose strength has an important bearing on disarmament discussions, and grouping them in a convenient way, we have:

France	530,000
Italy	400,000
Poland	266,000
Czechoslovakia	139,000
Rumania	240,000
Jugoslavia	184,000
Turkey	140,000
Russia	940,000
Japan	300,000

These figures can at least be multiplied by three to represent the field army which would be available on mobilization, after calling up the reserves trained in recent years. In several cases allowance must be made for semi-military formations, e.g. Italy has 90,000 gendarmerie and permanent Fascist militia; Poland and Rumania have each 60,000 gendarmerie; Jugoslavia 30,000. Russia trains 840,000 in her territorial militia according to the last known figure.

The question of adjustment for overseas garrisons affects France and Italy only among the European Powers. In the case of France 200,000 have to be deducted for the garrisons in North Africa, West Africa, Indo-China, Syria and lesser territories. Of this total,

however, roughly two-thirds are in North Africa, and so within relatively easy access of the home country, so long as the sea passage is secured. The French lay stress on the point that their recruits are not ready to be employed in the field until they have completed six months' training, and that the total of the untrained is 150,000. In Italy's case the deduction for forces stationed overseas, mainly in North Africa, amounts to only 30,000. It should be mentioned that her effectives legally provided for total 507,000, but of these not all have been utilized, and even so a proportion are sent home during the winter.

But let us leave the realm of arithmetic for a clearer atmosphere. The size of forces under modern conditions counts for much less than their efficiency and armament. What are the intrinsic values of the armies?

The French Army is still patterned on what one may term the 1918 model. A few years ago reduction of service to one year and old equipment had reduced it almost to the level of a militia. But by intensive use of the training period and the increase of professional personnel it has undoubtedly developed its efficiency. Moreover, it possesses a larger proportion of heavy guns and tanks than any other army. This asset gives it a superior offensive value, although that value would certainly be limited against any army with adequate machine guns.

The Italian Army has made great strides in the training of its personnel, who would be likely to shine especially in mountain warfare. The progress of the command and staff is less certain. A few years ago it was ill furnished with heavy guns and tanks, but has begun to repair its deficiencies.

The Polish Army probably comes third in value as in order of discussion. If somewhat handicapped in equipment, it has been making up the leeway. In its training there is a significant tendency to replace French methods by others more suited to its own human and geographical characteristics.

Of the Little Entente armies, that of Czechoslovakia is probably the most modern in ideas and equipment, and Jugoslavia the most backward. Its defective equipment would be a handicap except in conditions where it could exploit the peculiar military aptitude of its men. But its army is in course of rearmament.

Turkey under Kemal has made great progress—manufacturing soldiers has become the most flourishing national industry. The standard of training would certainly prove in any future test far higher than it was in 1914–18.

The same reflection applies to the Russian Army. It may be better in theory than in practice, but it is in all probability superior to the old Tsarist Army, irrespective of its immense size. Great interest is shown and great efforts are being made in modern mechanized warfare.

The Trans-Siberian railway is now double-tracked as far as its junction with the Amur railway, and work on this final stretch to Vladivostok is being vigorously pressed. Supplies have been accumulated to maintain the Far Eastern Army of 150,000 men, which includes a large number of tanks, and has as its main striking arm a great fleet of air-bombers.

Until 1932 reports suggested that the Japanese Army had not advanced much beyond its level of 1904–05; that in tactics and armament it had done little to profit by the experience of 1914–18 in the main theatres, an experience which it did not share. The experience of Shanghai tended to confirm these reports. Since then there has been a thorough overhaul, and in the conquest of Jehol the Japanese forces revealed a new technique—their successive advances being prepared by air bombardment and carried out by a chain of motor columns, moving with remarkable swiftness over the frozen countryside. A higher proportion of the Japanese soldiers are now receiving mechanical training than is the case in any European army.

CHAPTER IX

THE EVOLUTION OF THE BRITISH ARMY 1927–30

In the historical evolution of the British Army the year 1927 will be remembered for the first constitution of an entirely mechanized force. If this act set up a landmark, it was less successful in providing a signpost, owing to the defective composition and charter of 'The Mechanized Force'. This defect in turn was largely due to inadequate forethought and to the belated measures taken to organize the force.

A logical beginning would have been to inquire—'What is the function of a mechanized force in modern war? how should it fulfil this function? and how accordingly should it be composed?' Having thought out the problem, a provisional plan might have been framed as a basis for trials to be conducted by officers who had given long thought to the question of mechanized warfare and who, in consequence, might be expected to obtain the most value from the experiment. For the only reasonable purpose of carrying out the experiment was to discover what a mechanized force could do if handled in the best way —the way that would exploit its qualities to the full.

Instead, the infant force was simply a hasty and haphazard fusion of such mechanized units as were available in the Southern Command, and the officers who, by the fortune of service, became its foster-parents had to arrange its upbringing with little preliminary guidance. The method at least was characteristically British.

Yet for all these handicaps 1927 may come to be known as the year of 'Conversion by Demonstration'. For if it

was marked by certain material progress it was marked still more by a turn of the mental tide. This perhaps was most due to the impression of the paralysis of ordinary forces in face of mobile armoured troops. In the final Southern Command exercise, the 3rd Division, even with the aid of a cavalry brigade, was virtually paralysed by the presence—the omnipresence—of the Mechanized Force. Quitting one position by daylight, it essayed a hurried bound forward, excellently conducted, but before it could reach its goal, merely nine miles distant, it was headed off in front and struck in flank. And although only three companies of tanks were available against two-thirds of a division, there was little doubt in the umpires' minds that the division would have been broken asunder and its progress thoroughly disorganized. Peace requirements permitted it to reach sanctuary at Tilshead, whence in the dark early hours of the next morning it essayed a further six-mile bound to temporary safety on the wooded banks of the Avon. Exceptionally good leading and marching, coupled with certain delay in the pursuit, enabled it to gain this shelter, but the weary infantry had hardly reached it before they were encircled by the Mechanized Force. There they would have had to remain until night came again. And during the interval their crowded sanctuary was, and would have been continuously, a target for air fighters and bombers.

This experience revealed that an infantry division is now between the tank devil and the high sky—to vary a familiar choice of evils—for a tank-proof locality is usually a condensed and defined target for aircraft. Even if they survived the rigours of a harassed night march and the perils of a day of unrest, they could hardly hope to escape their armoured pursuers during a second night. For earlier exercises had shown both the feasibility and the terror of a tank assault in the darkness.

But to appreciate the impotence of infantry divisions it was not necessary to assess their probable losses. For if

they could only scurry from bolt-hole to bolt-hole, as time and tanks permit, what influence could they exercise upon the strategic issue of a campaign? The supreme benefit of these practical demonstrations of the power of an armoured force and the impotence of an unarmoured force was that they rapidly consolidated and immeasurably extended the hold on military opinion arduously won by the advocates of mechanical warfare over a period of years. Where argument had ultimately slain its thousands of sceptics, demonstration slew its tens of thousands.

At the psychological moment, aptly gauged to the strength of the tide, came a striking address from the Chief of the Imperial General Staff to the officers of the Mechanized Force at Tidworth—setting the seal of authority upon the new doctrine of warfare. By clear and indisputable statement of the way that the machine gun had annulled infantry attack, a nullity made still more hopeless by the intervention of air attack and mustard gas, he showed that large man-power armies were beyond resurrection, and that only by the development of armoured mobile forces could warfare be rescued from barrenness, and the art of generalship—the only hope of economy of life and money—be revived. The effect was most marked, almost electrical. Travelling through the manœuvre areas one could sense that the Army felt that here was the authoritative lead for which it had been waiting.

In Oxfordshire one had already found a divisional commander, imbued with war reality, taking steps to stop the farce, too regularly played in these post-war days, of infantry attacks across the open against positions held by machine guns. The timely closure of this peace-time farce would be one guarantee against the revival of another war-time tragedy. Subsequently, with the approval of the Aldershot Command, it was laid down that all columns, including advanced guards, must include armoured fighting vehicles; that no attack can normally be made without using tanks. A refreshing note of realism was sounded in

the remark that 'it must be remembered that a few well-placed machine guns will completely disorganize an infantry attack, and it is considered better to employ tanks to overcome these weapons than to suffer heavy casualties. That at present we are in possession only of a small number of tanks in no way excuses us from not using these weapons correctly.'

That dictum was a reversal of the doctrine current in recent years, which decreed that as tanks were few and precious they must be held in reserve and concentrated for the decisive blow in battle. It is unquestionable that this use for the decisive blow, as the great captains used their heavy cavalry, is the most valuable and the correct one in principle. But a decisive blow presupposes preliminary blows to fix and disorganize the enemy, and if no such blows can be effectual without tanks, even in the case of a mere infantry-battalion attack, it is obviously absurd to hoard tanks for later use. Once driven to the conclusion that tanks are essential, not only for the decisive attack, but for every preliminary attack, the unanswerable deduction was that the Army possessed far too few tanks and far too many infantry.

Unfortunately, between drawing a deduction and applying it there is often a gap—especially in Britain. For diagnosis of the tactical conditions of a 'mechanized' body —of troops—experience of the 1927 Mechanized Force, immature as was its form, was of some help. One found that the first concern of the commander was with the problem of the protection of the force itself. In this attitude he was fulfilling the 'monumental' words of Field Service Regulations: 'The security of a force and of its communications is the first responsibility of a commander.' Experience, as well as reason, tended however to suggest that against non-mechanized forces protection from enemy interference was, on the whole, a minor problem. Fat oxen do not approach, far less do they attack, a carnivorous tiger—and this tiger had a crocodile skin. Nor did the

medieval peasant advance upon the mail-clad knight. At the most he tried to intercept the knight at some defile where nature offset the knight's superiority. In few parts of the world are such convenient defiles numerous, and the difficulty of finding them when and where required is greater than that of a mechanized force in using its fluidity of movement to pass round them. Here it is worth recalling that the Mongols, although their army was entirely composed of mobile troops, found neither the Himalayas nor the far-stretching Carpathians a barrier to their progress. For to mobile troops there is usually a way round.

On the move the combined fire-power, armour and mobility of a mechanized force gives it ample security against direct interference. And even when halted at night, the revival of the laager—or, more truly, the Hussite *Wagenburg*—creates a field fortress which no enemy would be so rash as to attack twice. A tiger is no less unpleasant to approach in his lair than when on the prowl. Serious annoyance to such a laager could only come from long-range artillery or air bombing, and the first possibility would be discounted, the second greatly lessened, if in war the force laagered at a greater distance from the enemy than it did on the Plain. A wider space, moreover, would accord better with its strategic rôle and with its powers of rapid approach.

What of the danger to such a force by day from the air? Here experience fulfilled prophecy in showing that a 'mechanized' force was a far more elusive and evanescen target than a man and horse-power column. Even when a check caused temporary congestion, and so created an air target, that target often dispersed again before the fighting aircraft could 'get off' and be directed against it. Aircraft can hardly be kept aloft indefinitely in the hope of such a target. Again, it is far easier for one's own aircraft to protect a fleeting target created by a temporary check in a fast-moving column than to protect a slow-

moving column which is a continuous target so long as it tries to move.

Air observers reported that, except when checked, the mechanized column 'flitted' along the road in a way which attracted little attention and gave less encouragement to seekers for a feasible target. This dilution of movement would be still greater if, as is probable in future war, such a force moved on a broad front when near the enemy and, when distant, adopted what may be called an 'independent' method of movement, i.e. the vehicles moving independently and as fast as possible by lengthy bounds from one halting point to another. However good are drivers of vehicles in keeping formation, checks are inevitable, and these cause more wear and tear on both the machines and their drivers than a faster speed from point to point. The obvious objection is that a faster-moving force at longer intervals would occupy more road space, superficially. But it would occupy the road for less time.

Mechanization, in fact, may be a military parallel to relativity, changing accepted conceptions of time and space. Further, this 'dispersed' movement would offer less target to the air between the halting points; these, moreover, would be selected where concealment was facilitated, and defence against air attack could there be organized better than in a moving column.

From the material security of the force we pass to the more vital problem of the security of the commander's plan—for which he needs information on which to base the plan, control during its execution, and the means to overcome the resistance to it. It was a popular comment, especially among the higher commanders, that the tank was blind. This led to suggestions that some unmechanized, or at least unarmoured agents of reconnaissance must be included in the force, and that the armoured part was only suitable for the final punch. But exponents of mechanization doubted the wisdom of this mixture and felt that the coming of the light tank and the six-wheeled armoured

car, both on the verge of production, would provide the solution. One argued that the armoured vehicle is not merely able to search a wider front and more capable of penetrating the enemy's screen than are unarmoured troops, but at the worst a man looking through a slit in armour can see more than one who is forced to bury his face in the ground. The repeated attacks 'in the air' and the unpressed retirements seen in the year's exercises had revealed the incapacity of the older arms even to obtain information beyond the bare fact that some of the enemy existed, and were firing from a certain locality.

Control was the real problem—far more than direct protection—of the mechanized force, because of its very fluidity, the distances it covered, and the speed both of its movements and its engagements. Early experience brought out the lessons that ciphering wireless messages was impossible, because of the time required, and that more staff officers were essential, including one whose sole duty should be to 'appreciate' the enemy's situation and to direct air reconnaissance to confirm or modify his appreciation. A still more important point was brought out by the Chief of the Imperial General Staff in his dictum that, as with cavalry, the commander must be very far forward, and that the subordinate commanders must be so trained beforehand to a common habit of thought that they would reproduce in landship warfare the intuitive team work of Nelson's captains. And he also emphasized that the commander would probably have to supplement his wireless orders by the personal direction of staff officers who knew his mind, and could guide formations to the point and in the direction intended—a revival of the method of the Napoleonic expert aides-de-camp which one had for years advocated as essential, and, indeed, the only solution of control in modern mobile warfare. If it had not been cut out of the original draft of the first post-war manuals, before official issue, much waste of effort might have been saved and the value of the

training proportionately increased during the years that followed.

From the problems which surround the movement of a mechanized force and its 'approach' one passes to those of the attack. Here the exercises were only concerned with the attack upon orthodox man-power forces. Even to-day the conflict of mechanized forces lies still on the borderland of imagination, although when it becomes reality the likelihood is that this conflict will be akin to naval warfare, with the land fleets operating from pivotal bases. These, however, unlike naval bases, will be capable of rapid organization and fortification, and thus could be progressively extended towards and into the heart of the hostile country.

It was in regard to the problems of attack that the first year's trials of the Mechanized Force were least satisfactory and least enlightening. The reason was that the problem seemed to be viewed as mainly one of 'pound and punch'; and the method, as an orthodox development of the typical infantry-brigade attack. In consequence, the advantage of mobility was mainly unexploited, and any deductions were too much dependent on the comparative effect of bullets and shells that were only fired in imagination.

For the defence of a normal man-power force the field gun was still the chief weapon. True, a ·5-inch anti-tank machine gun had just been developed, but even as a penetrative weapon it was far from satisfactory, for unless it could conveniently ensure that the tank was end-on or broadside its effective range was only a hundred yards. It was also so heavy as to be almost unmanageable. However, the production of such a weapon was assumed, and infantry battalions were issued with two weighted dummies apiece. In Southern Command they perspiringly dragged them about; but with small result, despite the restricted area in which the mechanized force usually manœuvred. In Aldershot Command their unwieldiness

led to the use of an unweighted substitute, on the assumption that such weapons would inevitably require to be moved on a mechanized mounting. One felt that assumptions were carried rather far, and that the tanks might just as well have claimed the speed and invulnerability of some futuristic model.

As for the defensive value of the field gun, calculations were guided by anti-tank practice on the artillery range—and so perhaps somewhat exaggerated. To fire in tranquillity at two dummy tanks is vastly different from picking out individual targets, under battle conditions, from a long line of tanks which are rushing and firing at you. Naval gunnery figures from the war showed that the difference between practice shooting and battle shooting was one of division by forty! However, the 1927 umpiring rules allowed that a gun would knock out a tank at a range of 400 to 1,000 yards—within that range the tank was considered capable of knocking out the gun—in six aimed rounds provided that the gun itself was not neutralized by smoke or by fire supporting the tanks. If the scales were weighted against the tanks, there was compensation in the incentive to develop means of assisting their attack. Among those tried were the use of self-propelled artillery, the use of low-flying aircraft to accompany the tanks and attack such guns as were not enshrouded by the smoke screen. The defect was that this combination of several extraneous aids reproduced a complexity which has been characteristic of modern tactics, and which was detrimental to mobility.

Hence, in comment on the exercises one was led to suggest a method which, as one remarked, would 'tend to reinstate the essential simplicity of the great military eras, and of the Mongols in particular'.

'It is that the actual tank attack should be made by combined units—down to the company—of tanks and tankettes (i.e. light tanks). The tankettes would lead, to pave the way by drawing the enemy's fire and testing his

defence. If found to be weak, they would go through it "all out", with the battle tanks on their heels. If strong, they would halt on any suitable close-up fire-position, thus turning themselves into a screen of minute pill-boxes, stationary to ensure aimed fire, yet capable of instant change of position at need. Through this screen the tanks would sweep, and the position of every anti-tank gun which opened against them would be smothered with a thick spray of aimed machine-gun fire from the tankettes. It is difficult to imagine any gun crew functioning effectively when this heavy spray of aimed bullets is added to the "water-hosing" fire of the on-rushing tanks. Once the battle-tanks were through the first layer of anti-tank defence, the tankettes would race ahead, pass through them and repeat the process against any further layers. Thus the tank attack would be an alternating process of movement and a compound process of fire. According to the hostile fire and the circumstances, the tankettes might either make direct for a chosen fire-position, or, like the Mongol horse-archers, race closer to the enemy before wheeling about and retiring a short distance to their covering fire-position.'

Four years later, but not until four years had passed, this idea was realized.

If the training season of 1928 did not directly shed fresh light on the military problems of the day it at least provided matter for reflection. The lack of fresh light was due to the lack of means to generate it. The Mechanized Force, in 1927 a hurriedly assembled miscellany, which authority frankly admitted to be imperfectly composed and equipped, was unchanged in 1928 except, paradoxically, for a few fresh unarmed vehicles. But its name was changed—to 'The Armoured Force'. If the name sounded ironical, in view of the small proportion of armoured vehicles, it was significant of a further change of thought. But in the absence of a new endowment, 1928 was a year of 'making shift'. Nevertheless, from these makeshifts,

these copiously varied improvisations, certain deductions could be drawn. Paramount among them was that of the influence of mobility, both when combined and when uncombined with armour.

In 1927, when an Infantry Division had been pitted against the Mechanized Force, it had suffered strategical paralysis. In the 1928 exercises the 3rd Division was strengthened by a small proportion of mobile troops and tanks, and it suffered, not paralysis, but a condition which, seeking exactness, one may term a strategical arthritis. The symptoms were that it was too stiff in its joints to do more than sit tight and make an occasional short lunge against an opponent easily able to evade it.

In the Aldershot and Eastern Command exercises similar symptoms were detectable. Repeatedly the larger infantry force was placed at a disadvantage and failed in its strategic task against a smaller force, which included some mobile and armoured elements. The presence of tanks not infrequently sufficed to cause arthritis in the opposing command. This was no discredit.

Confronted by the puny armoured elements of to-day, an infantry force may feel passably secure when in a soundly chosen position, and fortified with its green and white flags that represent anti-tank weapons not yet in production. But once it moves out, and still more when deployed for an attack, it is acutely sensitive to an armoured threat. More and more clear is the lesson that such infantry forces have little strategic value except that they can form a continuous living wall along a frontier. With our small army that is out of the question and no part of our military problem.

But if it was the threat of armoured attack that crippled the essential freedom of movement of these infantry forces, it was mobility that, in most of the actual exercises, beat them strategically. Small mobile elements carried out the vital tasks or seized the vital points, with the infantry mass powerless to intervene. More often these mobile

elements were motorized, sometimes they were mounted. But if horse-given mobility is far better than none, the year's exercises gave little support to the idea that it is equal to mechanized mobility. For the quick seizure of vital points the cavalry frequently detached their mechanized machine-gun squadrons; in reconnaissance they sent out a few motor cyclists, who obtained information long before the mounted patrols could hope to do so.

The fact that the individual horse can traverse some ground and some streams that a machine cannot has little effect on the broad question. For the cavalryman is usually forced to dismount to carry out the tactical, or key, part of his task, whether it be scouting or fighting. Sometimes he may be able to dismount later than he would if in a reconnaissance vehicle; but, on the other hand, he takes far longer to cover the approach stage—which is often nine-tenths of the total distance. On Salisbury Plain neither mounted nor unmounted troops met many obstacles to their movement, except from private property, and comparison merely showed that horses are a slower means of movement and one of inherently less range and endurance. In the close country of Sussex neither horses nor tanks were able to leave the roads, except at certain points, but tanks if permitted could crash through hedges as horses cannot.

The fundamental error of controversy on the subject of cavalry is that the debaters persist in regarding cavalry as a fighting arm in the old sense. Tanks are a fighting arm. So are infantry, whatever their present defects. But cavalry to-day are simply scouts or fighting men who use a horse as their means of movement—though some already use a mechanical means of movement. As scouts or fighting men they are often very effective, although this is more due to their training than to their means of movement.

The actual exercises of the 'Experimental Armoured Force' in 1928, though useful as practice in driving and

maintenance, could hardly be said to have carried us any further towards its main purpose as an experiment than reasoning—the cheapest form of experiment—had already carried us the previous year. For they merely served to demonstrate that the composition of the force was fundamentally unsuitable and to confirm an obvious truth that armoured and unarmoured vehicles do not mix. Nearly three hundred assorted vehicles were used to assist—or hinder—the action of the relatively small 'armoured-fighting' portion. This virtually comprised only a battalion of earlier medium tanks.

Four years earlier, when the original Martel miniature tank—or armoured mobile machine gun—was produced from commercial parts, one had argued on both military and economic grounds that such vehicles must form the main constituent part of any mechanized force or army. Both because by cheapness they made quantity possible, and because by quantity only could we assure that the inevitable accidents and losses of war should not reduce our hitting power to zero. Quantity of small machines is an additional insurance because it enables a far wider distribution of the risk through the dispersed and minute targets thus offered.

Although only sixteen of the earliest completed machines —Morris-Martels and Carden-Loyds—were included in the force assembled at Tidworth, their presence was not only of experimental but of argumentative value. For it was a reinforcement to those who contended that, as soon as the improved Carden-Loyds were available, the force should divest itself of its existing paraphernalia of dragon-drawn field guns, self-propelled 18-pounders, lorry-borne 3·7 howitzers, and unarmoured machine guns. This vulnerable miscellany hampered and complicated the speed, security, and handling of the force without equivalent compensation. It had, indeed, the air of a large chorus as a vocal background to the few unduly prominent stars. The performance led me, as one of the audience, to urge

anew 'that the fighting part of a true armoured force should be mainly composed of light tanks such as the new Carden-Loyd, with a proportion of "gun tanks" such as the new sixteen-ton Vickers for its extra fire support, and perhaps a sprinkling of six-wheeled armoured cars as its long-range "feelers".'

On the other hand, a considerable body of opinion wished to make the force completely composite, by including infantry in it. Some demanded a whole battalion. But, however useful this might be for establishing bridgeheads and clearing small localities, its sponsors did not perhaps take account of the relative ease with which a truly mobile armoured force could avoid most of these obstacles by a detour, or of the increased 'internal' obstruction caused by the inclusion of non-armoured fighting men in such a force. An ordinary infantry battalion would be neither economic nor useful. A stronger case might have been made for the inclusion, instead, of a small picked body of skirmishers, men specially trained in the craft of stalking and silent penetration until they were akin to the Boer and the Australian, the askari and the backwoodsman. Swimming might well form part of their training. A company of such 'tank-marines' would at any rate be of far more value than an ordinary battalion, and for such a number it would be more feasible to provide armoured vehicles.

The year's exercises again furnished several important negative deductions. One was that orthodox movement in a more or less closed-up column entails excessive wear and tear, both on machines and drivers, besides forfeiting much of the mobility inherent in mechanization. If the strain caused by movements in column tended to reduce the normal day's march accepted for the mechanized force, another 'conventional' factor was that those in authority attached too much importance to bringing it entire into action. Even allowing for the defective composition of the experimental force the current estimate of thirty, or even

forty miles as a normal day's march was so far below the capacity of individual vehicles, and of civil-transportation experience as to demand enquiry into its military limiting conditions.

Another experience was that development for action was, if anything, slower than from an ordinary infantry column; and a further experience that when, but only when, armoured vehicles closed up—intentionally or because of a block—they became a target for the enemy's bombing aircraft or artillery. Armour might save them from severe damage, but not from disturbance of their tactical cohesion.

The methods which serve for an orthodox, deliberately moving force, do not fit an armoured force of the new model. Its marching song should not be the 'Froth-blowers' Anthem'. Rather should it change the wording to 'the less we are together, the happier we shall be'. To preserve, not only its security, but its mobility, it should eschew what is commonly implied by the military principle of concentration. Instead of concentrating physically on the least excuse, as it did in 1927–28, it should concentrate mentally on keeping distributed. With such a force, concentration means congestion. Hence the natural deduction was that, both in movement and in action, it should *maintain dispersion over a broad front.*

From strategical we pass to tactical handling. Too often in the exercises armour was treated as justifying a bull-like directness of assault. Reliance on brute force to the neglect of art finds no countenance in history. And there is the sombre moral of the fate that befell the English chivalry at Falkirk and the French chivalry at Crécy. For all its advantages armour should be regarded as a privilege, to be used, not abused.

One pointed out in comment on the exercises at the time that armoured mobility should not be an alternative to art, but a means to make the art of generalship more effective; to ensure a smoother and quicker passage to the

enemy's rear, but not, if possible, by the hazardous direct passage through his front—no hazard or obstacle being so great as that offered by the front of an enemy firmly posted. The combination of smoke, supporting fire, and synchronized air attack evolved in the 'Armoured Force' might reduce the risk. But avoidance was better than reduction, and art was the key. One must accept that when armoured fighting vehicles are used to bolster up an ordinary division instead of in an independent force, the scope for manœuvre will be more limited. Even so, the most suggestive examples of the year in tank tactics were not in the Armoured Force but in the 2nd Division, where the tanks repeatedly attacked in the moonlight or twilight —with marked increase of their moral effect and their own security.

At the end of the 1928 training season the 'Armoured Force' was broken up. If the decision came to many as a shock, it was justified as a means both to reconstruction and fresh experiment. The force had not been true to its name in composition, nor truly fulfilled its idea in tactics. A better course, certainly, might have been to proceed at once with the creation of a real all-armoured force, but in default of adequate light tanks there was a promise of benefit, especially moral, in trying how the infantry might be resuscitated by an infusion of Carden-Loyds. A large number of these were at last being delivered. Two 'Experimental Infantry Brigades' were formed, each comprising one light-tank battalion and three new-pattern infantry battalions, the latter each having a mechanized machine-gun company. But although the earlier trials were of interest, its value was soon used up.

If the Army exercises of 1928 provided little fresh light, those of 1929 closed in a dull light. A sense of disappointment pervaded Salisbury Plain, and was largely due to the manifest artificiality of the War Office exercises which crowned the year's training. And the disappointment was the more marked because officers had looked expectantly

to them to redeem a season of curtailed training—caused by a severe cut in the training grant.

In one sense these exercises were the most important since the last Army manœuvres, for they provided the first occasion since 1925 when the troops of the two chief home commands had been pitted against each other. As in 1925, Westland (the Southern Command) brought to 'war' its whole available forces, and although Eastland (the Aldershot Command) only made its invasion with one division and attached troops, its force included considerably more armoured and motorized troops than in 1925. But, unlike previous years, the Manœuvre Act was not put into force, so that operations had to take place within the narrow limits of Government ground, with such small extensions as were permitted by a few public-spirited landowners. The areas were so cramped that they afforded neither scope nor true test for the increased mobility which was the main characteristic of the forces engaged.

A head-on collision was inevitable, and indeed 'directed'. Under the artificial conditions of 'war in peace' such a collision is more apt to produce false lessons than true. Fortunately such customary means of test can always be supplemented and corrected by the cheaper form known as pure reasoning. This will also be the safer form if it is based on a knowledge of history and an understanding of mechanical conditions.

Such reasoning might have saved both the money and the time spent on some of the year's experiments—although we should have been the poorer in humorous relief. For soldiers and civilians alike were provided with many good chuckles by the 'three-piece' miniature road-train which cumbrously hauled the new anti-tank guns—with the gun pointing to the rear while in motion and so far less tactically efficient than its mobile quarry, the tank. Again it really did not require a prolonged and varied series of tests to ascertain that a cross-country

machine of the Carden-Loyd type, little and low, was a better means of bringing the machine gun into action than by the old horse-limber and manhandling. And better also than the unarmoured six-wheeler or any form of large armoured pantechnicon. Yet the simple deduction was to some extent obscured by the 'brain wave' of attaching to each Carden-Loyd a four-seater trailer on tracks—admirably calculated to nullify their advantages. So long as the trailer is retained the extra load will inevitably reduce the mobility of the machine-gun carrier. Secondly, in contrast to the two-man crew of the armoured carrier, the four men in the trailer are exposed to fire. Further, as they decrease mobility, they also increase visibility—and vulnerability—for the carrier is not only slower in reaching a fire-position, but has less chance of reaching it unobserved, if it pulls a trailer behind.

It was the atmosphere of unreality—the experimental use of rather unpractical instruments in unpractical forms of test—which intensified the Salisbury Plain depression. But it had a brighter side, for one could observe a lifting of the old antipathy to progress in general, and to the tank in particular. With few exceptions, officers were no longer so ready to search for an excuse, or fasten upon a training incident, to decry the tank. Even the depression was a good symptom, for it seemed to arise from a general feeling that in the War Office exercises the tanks and other mechanized troops were used in a way which nullified their 'mobility value'. This feeling showed that officers in general, and general officers in particular, were coming to appreciate the essential nature of the 'new warfare'. Perhaps only one who had for years undertaken the uphill task of advocacy could measure the extent of this change of wind, and mind. One might still feel discouraged at the slow rate of change in equipment, at the paucity of tanks in comparison with the superfluous mass of infantry, and at the way the former were mishandled by converts who had not thought out the foundations of

their faith. But then, in conversation, someone would voice the very views which, three or four years ago, he vigorously opposed—as you remembered and he did not. As if by a vivid flash of light, the distance already travelled was revealed.

The official objects of the War Office exercises were six —to test in the field the experimental organization of infantry brigades, the best method of carriage for machine guns in the infantry machine-gun company, the organization of a cavalry regiment, the employment of light and medium tanks combined in one formation, radio control within a tank battalion, the experimental organization of ordnance workshops. Taking them in order, there was no question that the inclusion of light tanks greatly increased the offensive power of the infantry brigade. In practice, indeed, they formed the real assaulting troops, and the infantry battalions were little more than a supplement for 'mopping up' and taking over captured ground. But one questioned at the time whether this benefit to the infantry brigade was not purchased at the expense of the whole—whether it was adequate compensation for the loss of strategic mobility and effect which in war would result from tying tanks so closely to infantry. The doubt was generally shared, and the subsequent removal of the light-tank battalions from the two Experimental Brigades and their return to an independent tank formation, came as an answer to the question.

A lesser aspect of the year's experiments was the inclusion of mechanized mortar batteries. This seemed an unqualified asset.

With the second object of the official tests I have already dealt, and need only remark that it was not the 'best', while the third seemed to be a characteristic example of our national want of logic. Mechanization certainly increased the power of cavalry in proportion to the increase of mechanization. But it would mean that they ceased to be cavalry except in name and expense. And the mix-

ture of horse and machine was a compromise of dubious practical result. It would be more logical, one suggested, either to convert them completely into 'new cavalry'—completely mechanized troops—or to maintain them on a strictly horsed basis.

The fourth experiment, the combination of light and medium tanks, went some way to fulfil a suggestion which I had made two years before—when the first mechanized force was improvised and the light tank was in infancy. But the unfulfilled part of the suggested method offered, in my view at least, a possibility of further improvement. One medium-tank battalion had been reorganized to comprise two companies of medium tanks, sixteen in each, and one company of thirty-two light tanks. After watching it I still felt that light and medium tanks should be combined in the company, and not merely in the battalion.

Secondly, the light tanks were used as a screen ahead of the medium tanks, to draw the fire of the enemy's anti-tank guns, and to probe his defences. But they were too eager to rush in and assault these guns—a method that risked too much and expected too much—for real war. Where the defences were strong the light tanks would suffer too heavily, while, firing on the move, their fire would not be sufficiently effective.

'They might do better,' one suggested again, 'by more fully fulfilling the Mongol method. If the enemy is found to be weak in counter-weapons, by all means go ahead. But if he is known or found to be strong, let the light tanks wheel about after drawing the defenders' fire, and then take up some previously noted fire-position on which they can, for the moment, convert themselves into stationary machine-gun nests. From this position they could develop a really effective concentration of aimed fire while the second line of tanks advanced to deliver the actual attack.'

The use of radio control within a tank battalion was primarily a technical problem, but the exercises at least confirmed theory in showing that such control would

vastly alter conceptions of strategic and tactical mobility. As for the mobile ordnance workshops, the general deduction seemed to be that they should not accompany the fighting part of a formation, and that a breakdown lorry with spare parts should suffice for this.

While the training season of 1929 closed with a depression, 1930 opened under a cloud. The expectation that at last an all-armoured brigade would be formed was disappointed. Then, in consolation, came the news that the two tank battalions stationed respectively in Aldershot and Southern Commands would be combined for training as a 'Medium Armoured Brigade'. But as two swallows do not make a summer, so two battalions did not promise a brigade that would be really suitable for a productive summer's training. The missing third would inevitably make a great difference in the scope for tactical combinations.

What prospect remained was swamped by cloudbursts. For the one general who certainly increased his reputation in the exercises of 1930 was General Rain. He showed a genius for striking at the crucial moment, a malevolently inspired *coup d'œil* which other generals might justly envy.

In the decisiveness of his strokes, he even performed the 'hat trick'; for, by curious coincidence, he submerged in turn the final exercise of the 4th Guards Brigade, of the 2nd Division and of the combined Aldershot and Southern Command troops on 'the Plain'. The consequences were the more disastrous because each of these exercises gave promise of being the most interesting of its respective series, a promise that was never fulfilled. In the first the South Downs were metamorphosed into foothills of the Himalayas for the purpose of trying out new methods in frontier fighting, and there was the exhilarating original spectacle of guardsmen turning themselves into guerrillas and applying Lawrence's axiom that for such warfare the normal principles of war should be inverted.

In the 2nd Division exercise, General Rain's night

attack forestalled a night attack by Brigadier Wavell's brigade group. This was the more unfortunate because the project of such a stroke was a refreshing change from the usual dawn attack and it would have been interesting to see, or at least to hear, its upsetting effect. The consistency of our Army is both its strength and its weakness. If we try a new thing as a surprise, we are apt, in our delight, to continue it as a custom, and so to strip it of surprise. Dawn attacks themselves were originally a means of taking the opponent off his guard. Now it is a real surprise, and relief, to the onlooker if any exercise does not work up to an attack at dawn!

Even more untimely was the fate of the final exercise on Salisbury Plain, for it seemed almost certain that here we should see the improvised Medium Armoured Brigade used as a whole, and used in a way suitable to its qualities, passing round the enemy's flank by night to strike at them while on the move next morning. Thus we might have enjoyed one positive example of the test which the year's chief innovation was devised to produce. In the previous exercises the tanks had been launched so regularly against prepared positions, in nullification of their mobility, that one might almost conclude that, like driven game, they were meant to be shot. If the idea was to produce a battle, it really produced a battue. Where they were not thrown against the strong front of an enemy position, directly along the all-too-certain line of expectation, they were reserved to throw at the opposing tanks, apparently on the subconscious theory, 'let the tanks kill each other, then we can get on with the war'.

It was reserved for General Rain to punish these slips. And he allowed no chance of redemption. Through his intervention, the training season was shorn of the ultimately positive lessons in the art of generalship and in mechanized manœuvre that it might have yielded. To the cultivation of generalship the loss was specially unfortunate, because each of these three schemes put a

premium on unconventional methods and incited the commanders to elasticity of plan and execution. To the development of mechanization, the abandonment of the last exercise, especially, meant that we were left for 1930 to reflect chiefly on examples of how armoured forces should not be used and of the power of mobility abused.

It is not easy for the observer to focus incidents in the light of real war conditions when exercises have to be carried out on the Government ground at Aldershot and on Salisbury Plain—areas absurdly narrow in comparison with even the present range of mechanized forces, and further cramped by wire fences and innumerable 'Out-of-Bounds' patches. To see a battalion of tanks advancing in a long string over open downland because they were confined to the road by a few strands of wire was a ridiculous sight. It violated the essential nature of tank action, which rests on cross-country movement and wide frontages. Care for such restrictions is often carried to a pitch of both tactical and financial absurdity. On the Imber area one saw tanks waiting to pass in turn through a gate, rather than break through a fence that would have cost a few shillings to repair. Yet, besides offering a bunched target and delaying their manœuvre, they were consuming pounds worth of petrol and oil.

The Army at home has no training ground which offers scope for realistic test of and practice for the new mechanized forces. It is a gloomy outlook for our military future. Perhaps the only remedy might be to move these mechanized forces to the vast and sparsely populated areas of central Wales for an annual period of training. The worst danger of the present limits is psychological. It lies in the difficulty of shaking off such artificial habits, and the cramped ideas they induce, when war comes. In this connection there is an amusing story in General Spears' *Liaison*. On arrival near Mons, with the shadow of the German masses creeping perilously close, a message was received from the cavalry to ask 'if they were justified in

loopholing the walls of a farmhouse. Evidently they thought they were still at manœuvres'. In another place the author particularly remarks: 'In war . . . the soldier is either too tired or has no time to think; he will only do what comes to him naturally and instinctively, through long usage.' One fears that if war came to our Army, trained under present limitations, much of the value of our mechanized troops, and of the new mobility, would be forfeited through the shackles of peace-training habits.

Another aspect of peace-time exercises deserves emphasis. Because the executive acts and umpiring decisions are made under artificial conditions, any deduction from them, especially in detail, is largely a matter of individual opinion, of guesswork even. Thus it runs more risk of missing truth than does an analytical pursuit of general tendencies and effects. History attests this. Lessons learnt from peace exercises have, indeed, far more often proved false than those of pure theory, developed from logical reasoning and historical analysis.

It would be unfair, however, to say that the season's practice yielded no value. A number of points were certainly brought out by actual experience as could not have been done by any other method. One was the relative increase of mechanical endurance, particularly noticeable in the first Southern Command exercise, where the Armoured Brigade followed a sixty-mile trek to Bovington by a fighting advance north to the Avon in which over sixty miles were covered between 3 a.m. and early afternoon. This was the more significant because the machines were growing old, and so inherently more liable to breakdown. The fact that increase of age has been accompanied by a decrease of casualties, despite an acceleration of marching pace, is a tribute to training; and it is a vindication of those who argued that it was unwise to base calculations on early performances, and prophesied that as commanders became more mechanically understanding

and their men more mechanically trained, standards would rise, and difficulties grow less.

There was an illuminating illustration of this truth, and of the difference made by experience, in one exercise. A light-tank company commanded by an officer who had enjoyed three years' experience in handling these machines attained a remarkably high average pace without incurring casualties, whereas another company under an officer who had just come fresh to the task suffered numerous casualties although moving at barely half the former's average. Of the general improvement there was an even more striking example in Egypt, where five medium tanks travelled a hundred and thirty miles across the desert from Cairo to Alexandria in thirty hours, and eventually, after taking part in exercises, returned to their base through a sandstorm that stopped all other forms of transport.

Among other mechanical impressions of the season was that of a marked improvement in the work of the armoured cars, and also of the remarkable influence they sometimes exerted on the opposing command, an influence not perhaps consciously appreciated, yet none the less dominating.

While there was an improvement in the use, and even more in the handling of light tanks, the fact that they were still formed as separate companies prevented that close combination of light and medium tanks which might have re-created Mongol tactics. Their best work was done as 'feelers' for the main body. Here they provided an answer to the protective device of picketing the march of an infantry column with anti-tank guns, and revealed a new peril to the infantry. For it was shown that these picketing guns could be 'netted' by light tanks, which stole up under cover to catch them unawares from a close-up fire-position. Thus an infantry force which relies on anti-tank guns to picket its march might be stripped of protection, especially in close country, without becoming aware of its nakedness.

But taken as a whole 1930 was a disappointing year, and

the exercises that were not washed out by rain were relieved by few weighty lessons. It had occasional light relief. Mr. Rudyard Kipling was present at one of the exercises on Salisbury Plain, and the story went round that he was asked his impression of modern war as there presented. He is said to have replied: 'It smells like a garage and looks like a circus.' An apt and witty *mot*, and the circus element was certainly prominent on the battlefield as well as on the road. But it was due mainly to misguided choice of objectives for the mobile forces, and the tendency to seek by blunt strokes in unreal battle what could have been obtained by indirect strokes to paralyse the enemy's vital organs in rear.

CHAPTER X

MOBILE REFLECTIONS

*

ON 'GRADUAL' MECHANIZATION

Our Army took the lead in mechanization. By comparison with other armies its state of equipment is still fair. By comparison with modern war conditions, however, its state is not merely unsatisfying but unready. All armies, our own more than any, have made more progress in the past decade than in any previous decade of peace. Yet relatively to the changed conditions the change is less than it has ever been. And so it is utterly inadequate. Armies as at present are not an insurance; they are a petition in bankruptcy.

Expressed mathematically, change in armies has usually moved at the same pace as change in the conditions of war, but several marches in rear. In the last decade the pace of armies has quickened to a run. But the pace of scientific and mechanical progress has been revolutionized, not merely accelerated. Thereby the armies of to-day are as helpless, and their prospects as hopeless, as a portly policeman trying to catch a motor thief—the thief of time. The consequences may be even more simply expressed. The armies of 1914 had over two months of grace before they lapsed into the stagnation of trench warfare. Nowadays the proportion of machine guns and other automatic firearms has increased enormously. No army has any scale of artillery approaching the proportion which in the later stages of the war could make a gradual advance possible by plastering whole areas with shells. The number of serviceable tanks is but a trifle of the infantry strength of any

army. As the habit is still to use them for bolstering up the infantry, and so to throw them against the positions best furnished with counter-means, the existing few would soon be used up.

It is thus a safe deduction and prediction that the armies of to-day would sink into trenches within a week if they ever got to grips. For there is more than a possibility that these infantry bodies would be dispersed by air attack or hamstrung by the bombing of their transport while they were still groping forward.

Every effort has been made to prop up the infantry, and to ensure them a rôle befitting their nominal dignity as the principal arm. Yet their attempt to simulate virility has been no more convincing than that of the 'principal boy' in a pantomime. They have been endowed with green and white flags to represent anti-tank guns, and these most versatile weapons have been allowed to score a percentage of hits such as no weapon has ever approached under war conditions.

On the other hand, the tanks have been heavily handicapped by the narrowness and artificiality of manœuvre areas, by their own fewness and obsolescence and not least by the way commanders have employed them: too often to the negation of their mobility. Yet infantry padding and tank slimming have alike failed to disguise the natural outlines of these trials. In the annual exercises the tank forces, so slender compared with the infantry bulk, have repeatedly dominated the situation. They have dominated it more each year.

It is not merely by their mobility, for this has been restricted, that their influence has been exerted, but by their subtle moral effect. Any commander of a large infantry force who knows that the other side has a small armoured force is subject to this. All his ideas and movements are governed by his concern as to its whereabouts and its latent menace. It cramps him at every turn, and he is compelled to take such care for his own security that his

offensive purpose becomes a secondary and flickering impulse. It is often amusing to see those who have been most disparaging of mechanization become most concerned when they have to command.

If the self-protective instinct becomes so predominant in peace it is likely to spell paralysis in war. No commander will ever feel safe in executing a plan. If he is about to take the offensive, and hears of a hostile armoured force in the offing, what will be the effect on his purpose? If he has actually begun an attack, will he continue it? Perhaps it would be not all loss if his resolution falters, for, as we have already pointed out, there is not the least ground for expecting that an infantry attack could succeed against a modern enemy in a position that he has had a few hours to prepare.

Thus the problem of to-day is not merely what tanks can do, but what mental and moral effect they can have. And here lies the ground for declaring that talk about 'gradual mechanization' is merely a soothing draught, which, though innocuous in itself, is indirectly perilous to administer to a grave case. The need for thorough conversion is urgent. If anything could accentuate its urgency it is the knowledge of the vulnerability of all unarmoured columns to air attack.

The significance and effect of bombing attacks on bus columns in the annual exercises are clear to any reflective mind. In many cases, such a mobile column would probably have remained as an immobile heap of wreckage, far behind the place—and the time—it was wanted. Marching columns may be less easily blocked than bus columns, but are more easily dispersed: an equally powerful brake on effective advance. Only when using pure armoured formations is this danger lessened. Otherwise the commander's strategic plan may suffer a paralytic stroke.

Let us, however, for the sake of argument take up the most moderate ground, and concede the claims, whether logical or not, made for the preservation of the other arms.

On this basis, and in the light of recent exercises, let us put a simple question. If any commander who took part was offered a division, either comprising the usual three infantry brigades or comprising one infantry brigade and one armoured brigade, which would he choose? One cannot believe that even the most conservative general would still prefer the former if he had to bear the responsibility of command. And if this be the conclusion from Salisbury Plain and Aldershot, how much stronger would it be in a theatre of war where there were no forbidden territory and inviolate fences to cover his flanks, and where he could not so easily gauge the whereabouts and approach of an enemy armoured brigade?

Hence what justification is there for preserving, even for the present, the infantry pattern of our five divisions? Once we have read the writing on the wall it does not diminish the danger if we remain gazing at the wall.

If soldiers appreciated the attitude of the public more fully they might hasten the process of mechanization. For public support will not be forthcoming—but will rather be diverted elsewhere—unless the public is assured that its money is going to provide an army radically different from that of 1914–18; one which will at least hold out a prospect of quicker and less expensive results. He who pays the piper calls the tune. It is possible that a mechanized army may fail to obtain quicker results. But an unmechanized army will not even be allowed to try. The memory of the Somme and of Passchendaele has sunk too deeply into the imagination of the British people, and is one of the few war lessons which are being passed on to the rising generation. This impression, indeed, is combining with the mechanical outlook of modern youth to dry up the flow of recruits to the infantry, an arm which unfortunately is tending to get only the dregs—first in point of quality and now even in quantity.

MOBILE REFLECTIONS

ON ANTI-TANK

The infantry prospect has scarcely been brightened by the actual appearance of an infantry anti-tank weapon—the ·8-inch machine gun. Indeed it has abruptly dispelled the illusions created previously by the use of flags to represent them. Flags which were not only delightfully easy to handle, but 'bred like guinea-pigs', so that tanks fell dead before them as if by a wave of a magician's wand. The actual weapon is so heavy and long-barrelled that it is a poor counter to mobile tanks, especially when hauled about, as at present, by a 'Tom Thumb road-train'. The alternative is to mount it in a tank, whereupon it ceases to be an infantry weapon, and perhaps even a light-tank weapon—for technical factors suggest that, if an all-round traverse is demanded, the gun can only be mounted in a machine larger than the present light tank.

The difficulties of the anti-tank problem, moreover, are not limited to the limitations of the anti-tank weapon. As tanks multiply on the 'battlefields' of peace, gunners are coming to realize the difficulty of distinguishing friend from foe—and how much more difficult would it be amid the murk and confusion of a real battlefield. Again, smoke screens are being increasingly developed as a protective cloak to tank attacks. But their value in deliberately blinding the enemy gunners might well be less than their unintended value in so increasing the murk that gunners would not dare to fire for fear of hitting their own troops. Further, the general increase of tanks and other mechanized vehicles so multiplies the 'noises off' that differentiation is difficult and surprise more easy. One used to be able to detect the approach of tanks while they were still several miles distant. But recently tanks, especially light tanks, have repeatedly arrived within a few hundred yards of the defence without being noticed. Thus, by a military paradox, the very fact that the use of tanks has ceased to be a surprise gives them more prospect than ever of achieving a surprise.

THE 'MAN-POWER' OBSESSION

Two of the main obstacles to the adequate provision of tanks, especially light tanks, are the 'man-power' and 'ideal' obsessions. The Army has so long thought in terms of numbers, counting heads, that although it pays vocal tribute to fire-power and mobility, it cannot learn to calculate in these terms. Hence it still wants 'to have its cake and eat it', and although eager for mechanized units, cannot bring itself to part with any of the old to pay for them. Further, it is slow to realize *practically* that mechanical power should replace man-power, and even in the mechanized units too high a proportion of surplus men is provided. In that otherwise excellent new manual, *Armoured and Mechanized Formations*, the strengths of units were excessively lavish in scale, e.g. an average of seven officers and men being allowed for each light tank, the machine which was originally intended as a 'one-man tank'.

The Air Force, having been born in a mechanical age, finds one man sufficient to fire a machine gun and pilot the machine which carries it. If it adds another man it adds another machine gun. But when one sees the man-power obsession of certain army minds one fears that if they had charge of the Air Force they would insist on every single-seater fighter towing a captive balloon with a basketful of spare pilots.

THE 'IDEAL' OBSESSION

The progress of mechanization suffers equally from the technical expert's pursuit of an ideal machine which will meet every possible, and normally improbable, condition. He wants a '100 per cent' mechanism instead of being content with a machine which will satisfy 80 per cent of all conceivable requirements. The cry for 'bigger and better' machines has already raised the estimated cost of the light tank from £500 to £2,000, and, if the desire for thicker armour and higher power is not limited, it will end in another large tank—and so forfeit the supreme asset of

invulnerability through smallness of target. It is almost laughable that soldiers should for centuries have contentedly put up with the numberless defects and limitations of the horse, and yet when a machine is invented they are satisfied with nothing short of perfection.

The exacting 'idealism' of the military attitude towards tanks has had unfortunate effects. One was the ruling that petrol should be treated as a 'normal' supply, like rations, instead of like ammunition. Another was the tendency to drag tanks and other mechanized vehicles down to the infantryman's pace, instead of recasting the infantryman's means and method of movement. It is significant that when these machines were tried in making half-hourly and hourly bounds respectively behind the infantry, they used nearly twice as much petrol in the shorter bounds. The difference of wear and tear must have been still greater. Yet the system of half-hourly bounds was itself a great improvement on an actual march 'inside' the infantry column. No wonder that the repair bill makes mechanization seem expensive.

The hardest problem to-day is not so much to obtain better machines as to obtain officers trained to think 'mechanically'. Perhaps we shall never obtain them unless we either go to the London General Omnibus Company and Pickfords to provide our strategists and staff in another war, or send our rising officers to such organizations for training. For we need mechanically minded realists, and not idealists.

ON REMODELLING THE DIVISION

Armoured forces, future armoured divisions, are as vital a requirement as cavalry divisions were in the past—before modern fire hamstrung them—to provide the Commander-in-Chief of our Expeditionary Force with a strategic thrusting weapon. What of his cutting weapons? It is likely that these, his ordinary divisions, may eventually be superseded entirely by the thrusting weapon—as

happened in the case of the combatant's weapons. But not yet, though to-day the cutting weapon is too blunt to be serviceable. Its edge must be sharpened.

For this the division needs to be endowed with more fire-power, tanks especially. Here again we cannot get a new suit unless we part with our old. To reduce the proportion of infantry is the natural way, the more obvious because in our training we tacitly recognize that we have only enough fire-support to cover a small part of the divisional frontage at a time. And, in the reorganization, a prime necessity is the provision of low-built armoured vehicles mounting machine guns and other heavy weapons. Experiments have only served to strengthen the conclusion to which reasoning already pointed. Thereby not only man-power, the dearest commodity in a professional army, can be saved, but also time and energy. For to-day, with machine guns horse-drawn and manhandled, their support is rarely close enough to be effective. They can be of some use in a deliberate attack, but to resign ourselves to the prospect of deliberate attacks is to have one foot in the trench-warfare grave.

Perhaps the most urgent argument for remodelling our ordinary divisions is a psychological one—the need for a tonic to counteract the depression, most marked among the most keen, that has spread as officers have come to realize the inadequacy of their instruments. If officers care for their men, as British officers do, it is not easy for them, once their eyes are opened, to relish the task of training those men to attack under conditions they know would in war be suicidal.

ON REMODELLING INFANTRY

When the 'Armoured Force' was temporarily broken up at the end of 1928 and its ingredients used in a fresh experiment—that of modernizing the infantry—one suggested that in this apparently retrograde step there was the possibility of a fresh advance. For although reason indicated the fallacy of tying tanks to infantry and so cramping their

mobility, a knowledge of human nature indicated the value, not only of such a negative lesson, but of convincing the infantry of the advantages of mechanization.

The forecast proved truer even than one hoped. Indeed, the enthusiasm of the infantry for armour, and for crossing the danger-zone at motor pace instead of walking pace, became almost embarrassing.

The next year enough Carden-Loyds were provided to form two battalions of light tanks, as well as to serve as armoured carriers for some of the infantry machine guns. An immature type, they had still many limitations, especially in crossing ditches or crashing through hedges, and their armoured turrets were merely simulated by canvas and wood. But by their nimbleness, their invisibility, and their smallness as targets, they made a deep impression. Candid artillerymen said frankly that they could not hope to hit such tiny machines. Candid infantrymen confessed that they felt as helpless as if attacked by a swarm of bees. A few score of such midget machines was a very small number for effect, but it was enough to make officers picture the result of an attack by several hundreds—or thousands. And through being not enough it was enough to make some of them realize that numbers are essential; that two hundred would be far more than ten times as effective as twenty.

But there was a still more far-reaching effect of this demonstration of 'light-tank' power. Although the infantry battalions were only given Carden-Loyds as machine-gun carriers, they soon wished to fire the gun from these little mobile mountings instead of dumping it on the ground. And before long they were craving to use them as 'in-fighters', as armoured assaulting troops. Why expose 150–200 cloth-clad infantry for half an hour in slowly crossing a bullet-swept stretch of ground in order to seize some tactical point when a dozen 'armoured' infantry could rush across in a few minutes—and have more chance of seizing it without a fight? In these situations minutes

are momentous, and the history of war has countless proofs that a handful of men can often gain a position which half an hour later a thousand cannot gain, while half a day later 10,000 are too few.

Before mechanization, such chances depended on luck or inspiration, but the advent of fully mechanized infantry makes them more calculable and mathematical. Again, 'soft-spot' tactics, which the war revealed as the only practical and successful form of infantry attack, become far easier and more menacing to the defender if 'infiltrating pill-boxes' replace infiltrating foot-sloggers.

Clear thinking, however, is essential to guide the infantry's new enthusiasm for a bullet-proof skin and mechanical legs. Such use of 'armoured' infantry is a separate need and problem from that of either light tanks or mechanized machine guns. Separate equipment and personnel would be required for this essentially different tactical rôle. If the infantry have such 'in-fighters', they could spare part of their unarmoured numbers to obtain them.

Just after the war I wrote an article on 'The Tank as a Weapon of Infantry'. Fifteen years later the idea seems to have a chance of fulfilment. The inclusion in the battalion of such mobile pill-boxes would simplify the training and tactics of the platoons by enabling them to dispense with Lewis guns, which at present make platoon tactics complex in peace and impracticable for war. Further, I would regard a battalion strength of 500 to 600 as both adequate and more suitable for modern conditions. This would mean a saving of up to 300 men in peace, and more in war, and would amply pay for the provision of 'armoured-infantry' machines, as well as armoured machine guns. These machines can afford to sacrifice some of their speed both for cheapness and for extra armour if requisite, although one may recall that the Roman infantry found a stout shield sufficient without wanting armour on their backs.

But however needful are such armoured infantry, they

are relatively less urgent, from a broad military point of view, than the provision of light tanks in true armoured formations. For the latter constitute the real strategic weapon which may nullify both the gaining and the holding of positions, and, by manœuvre against the enemy's supplies, cripple him without a fight, thereby saving thousands of lives.

ON RESTORING LIGHT INFANTRY

If we recognize, as we must, that infantry as constituted and trained to-day can make no headway against machine guns in normal open country, where will be their place on a future battlefield? Should we be content to regard them merely as a human reservoir for supplying machine-gunners to the ranks of a defensive position and to the tanks of a mobile force; or for filling up conquered territory with a flood of military 'police'? Even these two residuary rôles may be restricted. For military opinion is gradually coming to realize that it is not economy of force to employ six men to manhandle one machine gun when, if placed in a small armoured vehicle, two men can bring it into action and out, switch it quickly to any required sector and maintain fire while in movement—thus 'multiplying force by velocity'. And although even advanced military opinion still assumes that a crowd of infantry are necessary to play the 'walking-on' part of occupying conquered territory, it is a reasonable suggestion that this might be controlled as effectively, and with less provocation to the inhabitants, by a sprinkling of engineers protected by tanks and aircraft, sitting at the sources of light, heat, power and water supplies.

Moreover, unless this vast residue is to wait at home until the war is won, they will be moved forward very slowly on their feet. If there is one feature of past wars which air power, even uncombined with gas, has relegated to the lumber-room of history it is that of sluggish marching columns on the road.

For all these reasons the conversion of the residuary bulk of the infantry to more effective service is indicated. It may be conversion to other arms, to the manufacture of munitions, or to other forms of inactive service.

But there is both scope and need for a revived light infantry—a highly trained *corps d'élite*. If the number required would be small compared with the present overweighted scale, it would still be considerable. For although the decisive struggles of history have usually been fought in the plains, theatres of minor war include mountainous, wooded or otherwise difficult country where the man on foot—because of his unique locomobility—must still play an important, even the most important part. Again, while the use of infantry to attack in typically bare or rolling country—which is predominant—is merely a homicidal enterprise, such country commonly contains areas where fighting men on foot are useful, if not essential. Such areas include woods, broken ground, villages, or defiles obstructed by natural or artificial obstacles. Here tanks, even the light tanks now being developed, may not be able to pass, and gunfire from a distance may prove ineffective.

For 'infantry country', and areas, the man on foot, who is skirmisher and sharpshooter combined, remains essential. That does not mean he will be the decisive arm—for infantry have never been that save in name, and then as a misnomer. Throughout history there have been two grades of infantry; a lower grade, the ordinary mass infantry, who could 'hold' the enemy or hold positions; a higher grade, who could not merely hold but *disorganize*, and thus prepare the decision. To this higher grade belonged the Roman legionary at his best, the Swedish foot under Gustavus, the Prussian foot under Frederick the Great, the British light division of the Peninsular War, the regiments of backwoodsmen who fought under 'Stonewall' Jackson and Sherman. They owed their disorganizing qualification to weapon skill, mobility, and flexibility in

manœuvre. They had penetrative power and also the quickness to exploit an opening.

To re-create this higher-grade infantry would mean a reduction of numbers but an exaltation of rôle. To be the picked light infantry of a modern mechanized army would be a higher distinction than to be the cannon-fodder mass. Indirectly, a reduction in numbers would contribute to mobility. For while no army can hope to provide sufficient mechanized transport for its present mass of infantry, it would be feasible with a smaller number. 'Tank-marines' might be carried in the vehicles of a mobile armoured force. Just as mounted infantry were trained to ride on horseback as well as to fight on foot, so, in this motoring age, there is no reason why men should not be trained both to drive a fighting vehicle and to act on foot as skirmishers, dismounting from their vehicles. When infantry work of wider scope and range is needed, the armoured formations would be accompanied by infantry who were moved in motorized transport, probably armour-plated. For automobile is the modern sense of mobile.

How should the training of infantry be developed to fit them for a new effective rôle? By developing infiltration tactics more thoroughly, by giving the group more latitude to find cover and to manœuvre. It is the easier because the real opponent—the machine gun—is a firing 'point' rather than a firing 'line'. This fact encourages the articulation of infantry into independently moving 'points' that can infiltrate. Infantry must only be used in country which gives them adequate natural cover for these tactics. They must be given frontages wide enough for them to find and use cover, and to ensure that their approach is more or less unsuspected. They must avoid stereotyped methods of movement. They must revert to light weapons that an individual can easily handle, leaving the weapons that are heavy in themselves or heavy in expenditure of ammunition to be handled by mechanized supporting units which can mount them in armoured carriers.

The only infantryman of any use in modern warfare is one so highly trained in the use of cover that he can stalk machine guns, and so highly trained as a shot that he can pick off their crews. For volume of fire infantry cannot compete with mechanized troops—it is an arresting comparison that even the small and immature Mechanized Force at Tidworth, which included only one battalion of tanks, had a greater 'fire-pumping' capacity than the infantry of a whole division. Extreme accuracy of fire is the only justification for the rifleman.

Finally, one would emphasize that the fighters on foot who remain must be light infantry, not only in training, but in equipment. One of the marked impressions of recent years has been of the exhaustion, particularly in bad weather, of the infantry—which led in several cases to the premature close of an exercise—compared with the good physical condition of the mechanized troops. If this contrast is a 'physical' argument for mechanization, it is none the less an argument for clothing and equipping the infantryman as an athlete instead of as a beast of burden. Even his weapons are unnecessarily heavy. One of the most common objections to a lighter rifle is that it would lack the necessary strength. Strength for what?—largely, to stand the strain of being thrown about in drill so that it may make a resounding noise. No one would maltreat a sporting gun as we insist on the soldier's rifle being maltreated. Is there any serious reason why the infantry sharpshooter of to-morrow should not carry his light rifle in a waterproof cover? If not, the practical should surely override the picturesque.

The higher standard of training required for the new light infantry demands not longer service, but better use of the ample time nominally available. To-day the home battalions are often little more than superior militia, and the reason is partly the constant change-over of personnel owing to India's requirements and partly because of the drain of fatigues and semi-military employment upon the

time and men available for training. Here, one of General Maxse's post-war proposals offered an avenue of escape. This reform was the creation of 'employment' companies to relieve the soldier under training of the time-wasting burden of barrack duties, and it is interesting to notice that reduction of the length of service has driven the French to adopt a similar course.

ON RESTORING CAVALRY

In recent years cavalry have become so mechanized with Austin reconnaissance cars, Carden-Loyds, and six-wheelers that they might almost be termed a framework of steel with merely a filling of horseflesh. Viewed logically, such an amalgam would seem to have the defects that a compromise always has in war. If old-style cavalry still have a rôle, they should remain horsed; otherwise they should be mechanically converted to new-style cavalry. I imagine that those who are really convinced of the horseman's value would prefer to stand on their own hoofs. Then at least they would be able to prove whether they could move and fight where mechanized troops could not. But one finds more and more that cavalrymen recognize that their fighting days are over—ended by their own excessive vulnerability to modern fire weapons. The argument for their retention seems to focus purely on their value in reconnaissance and on their short-range power to move over certain tracts of ground where vehicles are 'stymied'. In this case it seems that the most reasonable way of assessing the issue would be mathematically. The value of information depends, first, on its exactness and, secondly, on the quickness with which it is gained and got back. Which is quicker—to travel nine and three-quarter miles on a horse and a quarter of a mile on foot, or to travel nine and a half miles in a swift machine and half a mile on foot? The answer is unmistakable, and the conclusion surely unanswerable. And it is well to remember that as the range of a reconnaissance increases, so does

the advantage of the more swiftly moving means of transport, to the point where the final stage must be made on foot.

It is characteristic of human nature to shrink from pitiless logic, and characteristic also to cling to an old friend which may have an occasional value for an exceptional purpose. But even if we concede the fullest claim now made by enthusiasts for the horse, it is clear, indeed all the clearer, that we do not need large units of horsed cavalry, but merely a few score picked men in each division to furnish patrols.

The best excuse, though not a reasonable justification, for maintaining cavalry brigades is that they provide practice for leaders in applying mobility. A younger generation is likely to arise, bred up with mechanized vehicles, who will be imbued with mobility of thought and action. But at present it is unhappily obvious that few commanders have been able to shake off trench-warfare deliberation. Some commanders have a natural gift for mobility, or in their war service missed the danger of developing immobility. But, otherwise, cavalry-bred commanders seem the most free.

ON VISIBILITY

Another significant reflection concerns the visibility of the various arms. One often feels that it is a pity that practical tests of comparative visibility, both for means of movement and formations, are not carried out.

A medium tank, for example, can easily be mistaken, particularly on a misty morning, for a clump of bushes. On most types of ground the visibility of a Carden-Loyd is much less than that of a man on a horse, and of several Carden-Loyds astonishingly less than that of several men on horseback. The former not only merge with the background more easily, but attract the eye less in movement.

ON REALISM IN TRAINING

Reflection on the composition of the land forces merges into reflection on their handling.

No feature of the Army training in recent years has been more encouraging than the zeal with which umpires have studied their difficult rôle and have sought to carry it out with scrupulous fairness. No feature has been more depressing than the unreality which has too often arisen, despite their efforts. Thus, there is once more grave danger of drifting into that gulf between the practice of the training grounds and the experience of the battlefield which has proved the grave of countless armies.

First is the unreality due to the fact that troops are put out of action only for a short period. The result is that commanders are never sufficiently penalized for the shortcomings of their troops and their own plans, and there is thus no incentive in peace time to understand and apply the vital law of economy of force—which dominates the whole course of war. With the coming of mechanized forces, this harmful consequence is emphasized, for units temporarily put out of action can rejoin the battle all the quicker.

The sole cure is to establish the rule that troops put out of action are permanently removed from further part in the particular exercise. The obvious objection is that 'casualties' will then breed in equally prolific fashion, for no commander who understands human nature will expect the same enthusiasm from the bulk of his troops as he feels himself. But, surely, the remedy also is obvious—to ensure that units and men put out of action, instead of returning to quarters or to rest, retire to a point where they can be employed in some other form of training of an energetic nature.

Worst of all unreality, however, is that due to disregard of the effect of fire. Watching many of the attacks carried out in exercises and allowed by the umpires, one might

well think that the machine gun had disappeared, and that the defenders were armed with flintlocks. And equally astonishing is the slender concentration of artillery fire often deemed adequate support, and excuse, to permit the infantry to advance and assault. Thus, in sum, we are in serious danger of slipping back into the tendency towards underrating fire-power which has marked every peace interval in modern military history, and which has produced the phenomena well known to all military research students, that the tactics of an army immediately after a war are closer to the reality of the next war than any of the tactical doctrines which succeed it periodically during the interval. The training of the French Army in 1875 was, in fact, far more suitable to the conditions of August 1914, than was the last field training carried out in 1913.

The only corrective is to base the umpiring of all exercises—at least so far as pre-existing weapons are concerned—on a test formula established by a statistical analysis of the most recent war data.

At Neuve Chapelle, in the first British offensive of 1915, the fire of 306 guns was concentrated on a 2,000 yards' front—roughly, one gun to every six yards—and enabled the first attack to succeed. In the second phase, when the front was widened to 8,300 yards, and the proportion of guns hence reduced to one gun to every twenty-seven yards, the attack collapsed in face of a machine-gun resistance which mustered not more than twelve machine guns to the mile.

On July 1, 1916, the British Fourth Army concentrated 1,500 guns on a 23,000 yards' frontage, or roughly one gun to every fifteen yards. There is still more value in a comparison of the field and heavy-artillery strength—one field gun to every twenty-one yards, and one heavy gun to every fifty-seven yards. The enemy's opposition—which foiled our assault and cost us the heaviest single day's loss in our history—came predominantly from

machine guns, and of these he had roughly eighteen to the mile. At Messines the following June, where our attack succeeded brilliantly within its strictly preserved limits, there were 1,752 field guns and 819 heavy guns for a 17,000 yards' front. This represents one field gun to every ten yards and one heavy gun to every twenty yards. The total artillery concentration was thus one gun to every seven yards. Its effect was aided by the explosion of nineteen mines on a nine-mile frontage, and to a lesser degree by tanks. The enemy's machine-gun resistance averaged 32 machine guns to the mile. At Ypres that autumn, where the Second Army was called in to salve, as best it could, the wreck of the early hopes, the Army Staff made a very careful analysis of the proportion of guns necessary to make an advance possible on given frontages. As a result, on September 20, our artillery concentration totalled 1,460 guns on a 6,800 yards' front, or one gun to every five yards; on September 26, 890 guns on a 5,500 yards' front, or one gun to every six yards; and on October 4, 1,625 guns on a 9,700 yards' front, or one gun to every six yards.

The following year, in the decisive surprise attack of the Fourth Army on August 8, in front of Amiens, 2,000 guns were concentrated on a 20,000 yards' front, or one gun to every ten yards. But 458 tanks were also launched to the attack, or roughly forty tanks to the mile of frontage. In addition, the German morale was declining, and continued to decline. Thus we find that in the later autumn battles the proportion of artillery was also capable of progressive reduction without detriment to the success of the attack.

From a comparison of these figures we may deduce that without adequate tank support, or other special aids, a proportion of about one gun to every six yards of front was necessary to enable the infantry to attack successfully. This seems to have held good, against troops of good morale, whether the defences were highly developed, as in

1916 and 1917, or hastily improvised as in the second phase at Neuve Chapelle. Nor does it seem that the actual proportion of machine guns mattered much so long as there was at least a certain minimum, which we may take as about twelve to the mile, provided that these had sufficient field of fire to cover the front with a web of bullets.

The issue turned on whether the artillery concentration was sufficiently intense to plaster the defences so thickly with shells that the machine guns were overwhelmed by sheer profusion of explosives, rather than by deliberate aim. For the machine gun was so small a target, and so easily concealed, that the guns rarely succeeded in knocking one out except by the 'plastering' method.

It may be said that in trench warfare the machine guns were better protected than they would be in the open warfare for which we have been optimistically training since 1919. The reply is surely that, as an offset, in open warfare the ground will be far less known, targets will be more difficult to locate, and there will be less leisure to locate them. Moreover, it was an oft-repeated experience of the last war that, under bombardment, the enemy machine gunners abandoned their emplacements for improvised and open positions in shell-holes or behind banks.

Allowing a generous deduction for lesser protection and a generous margin for the proportion of guns allotted to other tasks in these war-time offensives, we may deduce that an artillery concentration of at least one gun to every ten yards of front is necessary to enable an orthodox infantry attack to succeed in face of an adequate machine-gun defence. Infantry attacks in peace-time exercises which fall markedly below this degree of support are a breach of reality, and should be stopped by the umpires —unless they have alternative makeweights. These are two—either the aid of an adequate proportion of tanks or the existence of sufficient cover to allow the infantry to 'stalk' the hostile machine guns, and its utilization by true skirmishing methods.

MOBILE REFLECTIONS

ON 'SHUNTING' STRATEGY

The last few years' training has seen a stimulating increase in the number of exercises framed on a scheme of wide spaces and small forces. But the majority of schemes, at least of 'general ideas', are still based on a foundation of the semi-mobile warfare which characterized the 1918 campaign. So also are our Field Service Regulations and the doctrines of most foreign armies, and as a natural consequence their effort and study has been directed to develop a smooth-working tactical process rather than to resurrect tactical or strategic art. In the last war a divisional commander had hardly more scope for strategy than a platoon commander, but this has not always been so, nor is it likely to be so. There is much to be said for utilizing divisional training to practise and improve the detailed working of a division, and so ensure that it is turned out from the factory an efficient working part of the war machine. Viewed as a higher form of battle drill such exercises are admirable. There is, however, a wider question raised by the schemes upon which such exercises are based. They are conceived as if the main forces were as likely in the future as in the past to be engaged in a 'strategical shunting'—one army composed of a long line of divisions pressing back another similarly arrayed. In each line the divisions rub shoulders with one another, and manœuvre merely takes the form of extending an arm to embrace affectionately the flank of the opposite party.

As the history of war shows, an overlapping is more effective than a direct frontal push, and has often been effective in compelling an enemy's retirement, but compared with the true 'rear attack' it effects the minimum disturbance in the enemy's equilibrium—of mind and dispositions—and gives him the maximum chance to meet the danger and reconsolidate a new front.

In the fact that this strategy of overlapping became

increasingly in favour in the early part of this century lies one explanation of the increasing indecisiveness of campaigns—as seen in the Russo-Japanese War, and still more in 1914–18. So long as there was still an open flank it was possible to elbow an enemy out of his positions, but not to dislocate his organization. The immense size of modern armies has contributed to the growth of this linear or 'shunting' strategy.

But is it necessary that the normal training of the British Army should be based on it? We may still ask this even if we leave aside the historical evidence of the indecisiveness of the direct approach and the question of mechanization —both of which profoundly modify present conceptions of strategy.

The British Expeditionary Force to-day has shrunk to a handful, and at the outset of any future war would have to act as a handful. Hence it seems mistaken to train it to think in terms of either 1914 or 1918 strategy. Even if called on to act in Europe under one of the numerous Pacts, it is well to remember that even possible Continental armies have shrunk well below 1914 scale, and are still shrinking. Nor was our subordination of the B.E.F. in 1914 to the rôle of an extra link in a long chain an encouraging precedent. But, in most of our possible theatres of war outside Europe, the little B.E.F. would have to operate over wide spaces where close-linked chain formations and 'shunting' strategy would be out of place.

There is a further aspect. The idea of arranging divisions in a long line is really a nullification of the divisional system. When, late in the eighteenth century, armies were first organized in self-contained divisions, Bonaparte had the genius to appreciate their potentialities. Subsequent generations of strategists, however, by tightening up the dispositions, showed that they had failed to grasp the motive of the divisional system. To-day, surely, the problems and the composition of our army point to the need to train our Expeditionary Force to act in widely

separated small 'groups', ready to cover long distances, to manœuvre boldly, and to think strategically.

'Shunting' strategy is a mental relic of trench-warfare. Not only our conditions but our traditions urge that we should break away from it. Let us recall the example of Cromwell before Dunbar, taking every physical hazard rather than that of a direct attack upon an enemy in position. Look at him in the subsequent Scottish campaign, when at last he had superiority of force, yet, rather than take the obvious course, left his enemy one bolt-hole —an open path towards England. A big risk, apparently, but it gave him the chance to close on their rear, and by the 'crowning mercy' of Worcester he avoided the greater risks, military and political, of a long-drawn-out campaign in the Highlands. Look at Marlborough, twisting and turning in such bewildering manœuvres that his men thought him mad—until he walked through the Ne Plus Ultra lines, without sacrificing a life, except a few in marching. 'Sweat saves blood.' The aim of these masters —and theirs is the best English tradition—was to get by an indirect approach on the enemy's rear, knowing that once astride his line of communications and retreat he would either be paralysed or unhinged—in which case his natural tendency would be to fall back in fragments into their embrace.

ON INVERTED TRAINING

The British commander of to-day is usually stronger in the technique of war than in the art of war. In the last few years the originality of schemes has certainly improved, following upon a lead given by General Ironside and Colonel Fuller with the 2nd Division back in 1927–28. But the greater opportunity for practice in the *art* of war has not yet been exploited.

What is the cause? Is it that the British officer is by nature deficient of imagination or that the complexity of modern technique tends to swamp what Marshal Saxe

called the 'sublime', and what we should call the psychological aspect of warfare? Personally, I think that while both these factors have an influence there is a deeper cause—that in all our military training we imitate Father William by standing on our head. In other words, we invert the true order of thought: considering technique first, tactics second, and strategy—'also ran'.

In peace especially—and paradoxically—our whole attention is concentrated on the fight, whereas the logical object of strategy is to reduce the need for fighting. Strategy attacks the enemy's mind and will, and it acts mainly through the stomach—through attacking the enemy's supplies.

Peace-time conditions all tend to obscure this truth. In exercises the fighting troops and their first-line transport are present, but not the rear services, save in imaginary or skeleton form. In consequence the Q side, the foundation of all strategy, is overlooked or neglected. Other factors, apart from lack of the necessary transport, tend to accentuate this distortion of reality. One is the short duration of exercises. Another is the short distance which usually separates forces at the start of an exercise. A third is the justified impression that an ambitious officer should avoid becoming labelled as a Q expert.

The harmful reactions, moreover, are far reaching. The mobile arms—and hence the real strategic arms—cannot obtain full value through attacking their proper objectives, which do not exist in peace exercises, and so are used improperly: aircraft and tanks should both aim at the enemy's transport and communications, whereas their customary attacks on the fighting troops are merely spectacular illusions, mirages in the peace-time military desert.

One example of the consequences may be quoted. Watching tank attacks, officers often ask whether the infantry would suffer much harm if they were well dispersed and 'lay doggo'. Candidly, I do not think they

would, especially if they had time to dig themselves into narrow trench-slits. But the real answer is that the tanks should not be ferreting out infantry sections but shooting up the transport and supplies of infantry divisions and army corps. And the real question is what would be the strategic value of a scattered swarm of hungry infantry sitting in trench-slits?

Peace exercises give an utterly false value to 'positions', to the passive occupation of ground. Until we make strategy the foundation of our thought, our training and our experiments will tend not to reveal but to obscure the true lessons which, different in form but consistent in nature, can be traced throughout the history of the art of war.

ON THE USE AND MISUSE OF MOBILITY

The broader issues have been confused, in particular, by misdirection of the 'armoured' strokes. One is not referring merely to the neglect of strategic objectives, such as communications and depots. This potential aim is certainly underrated, because British soldiers know too much about that overrated leader of cavalry, 'Jeb' Stuart, and far too little about the effect achieved by Forrest and Morgan. The 'romance' of Stonewall Jackson has blinded them to the deeper lessons of the campaign in the West, where Grant turned, and Sherman decided, the issue of the Civil War, and where the exiguous mobile forces of Forrest and Morgan went far closer than the main Confederate armies to frustrating their purpose.

Even so, mobile forces must often aid the general plan by closer action against tactical objectives. But these should be apt targets. Unfortunately, in peace exercises much unreality exists and false lessons are drawn because the administrative services, the second-line transport, and the various headquarters assume such puny proportions compared with their war scale. They are peculiarly difficult to cover against the thrusts of armoured mobility, but

because they are small in peace exercises they are difficult to strike, and their assailants are rarely accorded full and real value for striking at them. Perhaps this is the reason why, instead of striking at the enemy's immediate rear, the armoured units are still habitually aimed at a front which he has had time to prepare for anti-tank defence. An armoured brigade should be given full latitude to avoid the enemy's anti-tank defences. Its line of approach should be as indirect as possible, and mobility gives it a wide range of possibility. A blow at the enemy's headquarters, signal centres, transport lines, and supply columns, would be likely to paralyse all the combatant troops that are dependent on those vital organs. In contrast, infantry disposed and dispersed for defence are a difficult target to hit, although in actual war they might not stand the sight of an oncoming swarm of modern high-speed tanks.

Again, the habit of launching tanks, or keeping them to launch, at the enemy's tanks is an unconscious tribute to the power of armoured fighting vehicles, a proof of the instinctive fear they increasingly develop in the minds of commanders. But it is not generalship. A general should employ his tools in the way that produces the maximum profit, not merely to cancel his opponent's assets. Moreover, this direct use and misuse of tanks not only confuses the essential issues of to-day, but confuses the battle picture. Thus it confounds umpiring and makes peace exercises more than ever unrealistic.

Of course, the misuse of tanks may be read as a tacit admission of their potency, a recognition that a battle without them is unthinkable, and that the other arms without them are powerless. It is a back-handed compliment. Because they are so few in proportion to the infantry, and yet so essential, they are called upon disproportionately. The infantry are often saved loss and exertion by their very immobility; the cavalry by their vulnerability, also because all soldiers are horse-lovers, and so, when in command, gauge generously the needs of the

horse for rest and water. In contrast, and in paradox, the less they value machines the more do they commonly expect of them. This tendency entails not only undue wear and tear, but tactical waste. We have come to count on tanks out of all proportion to the number that we can count in our present organization.

ON FLUIDITY

Finally, reflection raises a still wider question. The last question discussed was concerned with the use of armoured brigades in co-operation, if not close co-operation, with ordinary formations. For an armoured force as an independent strategical weapon it may be asked whether its qualities do not demand a still more radical reorientation of our ideas.

The difference of mobility between it and a foot-marching force is so immense that it prompts the question, 'Why assault at all, even indirectly?' If the enemy like to sit in positions, let them, while the armoured force interrupts their supplies or transfers its fire-power to fresh points where it can similarly paralyse other bodies of the enemy.

Instead of risking its armour in close combat, an armoured force might use this protective skin simply for a close approach, not for an attack; to move up to a 'fluid' position, whence, in comparative security, it can smother the enemy or cut his arteries of supply by a demoralizing fire. The suggestion may seem disturbingly original to the orthodox-minded, but originality is the mainspring of successful war, and he who applies a novel device by a novel method has oftenest attained revolutionary results in history. Bonaparte was dangerously unorthodox when he utilized the new organization of the French Army in self-contained divisions to form his force into a widely distributed net instead of the old single and cumbersome block.

So why not coin a new principle for the new force—

fluid, or distributed, concentration. To strike, by fire alone, at the greatest number of points in the shortest time over the widest area. And without ever making contact in the present tactical sense. Never giving the enemy a target, yet enticing him to waste his ammunition and keeping his nerves at an exhaustingly high tension.

Thus by constant 'in and out' approaches over the widest possible area, an armoured force might reduce a vast infantry army to inertia. Once that happens a moral rot is likely to set in among the hungry and helpless occupants of ineffective 'positions'. Thereby an armoured force might achieve the ideal which was the ambition of Marshal Saxe, that connoisseur of the art of war, when he argued that a really able general might win a campaign without fighting a battle at all—the ideal which was actually achieved by Caesar at Ilerda.

The Armies of 1914–18 were like huge fungoid plants, firm rooted and nourished through long stems. An armoured force has the power to be a deadly vapour 'blowing where it lists'; an influence, invulnerable less through its armour than through its power to move away. Thus it would be intangible, and all the more demoralizing.[1]

[1] The new principle suggested above has since been put into practice in the exercises of the 1st Tank Brigade under Brigadier P. C. S. Hobart in 1934—when a tank brigade made its first appearance as a permanent formation in the post-war British Army. These tactics of fluidity, together with movement in a state of wireless-controlled dispersion, formed the chief development in training since the experimental tank brigade of 1931–32.

CHAPTER XI

CONTRASTS OF 1931

MOBILITY OR STAGNATION

An extreme contrast made the British Army exercises of 1931 the most illuminating since the war. The first picture was seen in August, when the atmosphere of another August, seventeen years ago, was re-created at Aldershot by the mobilization of the 1st Division at war strength.

It may be true that imagination and calculation could have provided an approximate answer on all save the most detailed points. But as with a car, so with an army—the most thorough of makers' tests is not an adequate substitute for the final test which comes when a model is placed in the ordinary user's hands. Moreover, the test mobilization had a psychological result too marked to be missed. It brought home to observers the unwieldy bulk and complexity of a division as at present constituted.

The primary idea underlying this mobilization was that of seeing what reductions could be made in the stores and equipment carried with units, as a means to improve the mobility of the division. But its immobility was the ultimate lesson of the mobilization.

Four years of siege warfare, coupled with the natural growth of needs and invention, converted the soldier into a living Christmas tree, and the military unit into a super-pantechnicon. After the war the trumpet-call of 'back to open warfare' did not avail to reduce these immovable walls of Jericho. Something was done to lighten the load on the soldier and on the horse—by transferring it to his

transport. But this meant the growth of transport. If the soldier can now move a little more easily, his effective rate of movement is governed by the scale of his movement in mass—by the size of the column, the possibility of handling it, and its vulnerability to interference.

The problem has been partly obscured since the war by the skeleton size of units when taking part in peace-time manœuvres, and the fractional proportion of transport therein employed. It needed a mobilization to lift the veil, and to focus attention on the urgent need for reducing mass to manageability. Much of the superfluous fat is undoubtedly caused by the military tendency to provide for every contingency. Possibilities too easily come to be regarded as probabilities, and luxuries as necessities. It is an old, old story—a case of fatty degeneration.

Thus did the armies of eighteenth-century Europe swell until dispersed by the ragged but mobile mobs of the French Revolution. Thus, likewise, did the armies in the American Civil War grow stagnant from their own bulk until Sherman showed the way back to mobility by a ruthless scrapping of transport and equipment. It may not be possible for the modern army to contemplate such reliance on 'living on the country', but something must be scrapped in the Sherman spirit if such an army is to be capable of moving. And it is noteworthy that this 1931 experiment had its germ in a proposal that the year's training should take the form of a 'Sherman March'. In a characteristically watered form that was the purpose expressed in the 1st Division 'trek'.

Preliminary analysis of the problem brought to light some curious facts. It was found that since pre-Boer War days units had been dragging round with them a fortnight's supply of various consumable stores. And, presumably through oversight, this burden on transport had continued during the static warfare of 1914–18, in spite of the ease with which replenishment could have been made by motor transport. Again, in the process of re-

moving weight from the cavalryman, his emergency or 'iron ration' was transferred to the transport, which was actually carrying his next day's ordinary rations!

The post-war state of the division could, indeed, be summed up as a case for 'slimming' treatment. Cure was delayed because of slowness to exploit the increased mobility provided by motor vehicles. So long as the Army was dependent on horse transport a division was compelled to drag an endless tail of vehicles around with it, to meet not only its immediate necessities but possible contingencies. But the speed and range of motor transport have made it possible to bring forward stores from railhead as and when required.

Recognition of this obvious fact led in 1931 to a reduction of the number of lorries that actually accompany the division. The authorities also substituted three-ton six-wheelers for light thirty-hundredweight lorries in the divisional train. This substitution, combined with the elimination of stores, allowed the number of vans and lorries to be brought down from some seven hundred to, roughly, five hundred. The course of the 'mobilized' exercise sufficed to show that the reduced scale of the divisional transport was practicable.

In contrast, attention was forcibly focused on the truth that the real movement problem, and the danger of congestion, lies within the fighting body of the division. And that it is due to a superabundance of cumbersome horse traction, if also to an overload of equipment. How many people realize that a division still includes some 5,500 horses and mules and some 740 horse-drawn vehicles? The disadvantages of this incubus were vividly brought out during the mobilization.

Previous to it, an astonishing misconception of its meaning became current, even among soldiers, and was due apparently to a misleading explanation being imparted to the Press. For the test was spoken of as an attempt to solve the difficulties, especially the congestion, that had been

introduced by mechanization. One even heard it said that the difficulty of moving a modern division was due to its mechanization. This ingenuous comment ignored the fact that, apart from the rear services, only a few fragments of the division were as yet even motorized. Among them was one motorized infantry-brigade signal section, and one motorized field company of engineers, the latter a striking example of successfully applied mechanization. But how few were these 'modernities'!

Thus when the mobilized division marched out from Aldershot the first real impression—it seemed a surprise to many spectators—was how little the division had changed since the war. One watched the same interminable chain of foot-slogging men, interspersed with horse-drawn limbers and carts. The most visible differences were supplementary without being novel—the addition of a brigade of light artillery and of a divisional cavalry regiment. These have contributed to increase the road space occupied by the division from some fifteen miles before the war to nearly twenty miles.

Thus it was natural that all observers should be struck by the immense length of the columns. Twelve years had passed and memories had faded since battalions half a mile long had been seen on the march. And half this space is occupied by horsed limbers, cookers and carts. If bombed from the air or fired on by tanks, the men in the column might scatter and re-form—with a loss of time. Horsed limbers cannot. A chain that has such rigid links is perilously inflexible under modern conditions. Even greater was the impression of cumbrous bulk made by horse-drawn divisional artillery, each battery of six guns, and each brigade stretching well over a mile. But they at least did not look so anachronistic as the field companies of engineers, marching on their feet—so as to be sure, as cynic or realist might say, of arriving late and tired at any emergency point where their services are needed.

'So you've come to see the old-fashioned army?' a staff

acquaintance remarked to me. It seemed to me that an answer of symbolical fitness was, at that moment, supplied by the appearance of an ice-cream barrow bearing the legend 'Stop me', which was being pushed by a boy, on foot, in front of the column. But the 'gradualness' of military progress was to be even more vividly illustrated by a subsequent procession of the lumbering old horse ambulances which constitute my first childhood recollection of the Boer War. An innocent observer might well ask if they had been unearthed from a military museum to take part in this 1931 mobilization.

Meantime, above the columns, serenely sailed flights of aircraft, taking photographs of the points where in war bombs would have been dropped. They had plenty to photograph. For the columns, each originally seven to eight miles long, soon began to stretch out—but not with elasticity. The steep gradients of the Hog's Back were the cause of 'echoing' hitches which brought out the difficulties inherent in the mass of animal transport, even when free from the enemy's intervention.

But the delays gave one leisure to look overhead—and to think ahead. Then one's eyes came down to the ground —to the interminable columns with their mass of men and horse-drawn vehicles, slowly winding along the road. The sight gave one a shock when one thought of the development of new means of interference—not only air bombers, but tanks and motor guerrillas. How thoroughly did it seem to confirm the warning words of the Chief of the Imperial General Staff, in 1927, when he declared that 'crowds of men are out of place on the battlefield' in the face of such weapons. 'Think again of the result of the destruction of their communications and supplies!'

In the years since then we have seen infantry forces repeatedly paralysed, even under peace conditions, by the mere presence of such menaces. To move at all they have to take infinite precautions. In war, what is now a snail's pace would become full stop—and deadlock. And, while

we have witnessed the growing moral and mobile domination of aircraft, tanks, and motor cars, we have not seen the effect of another war-time check—mustard gas. It is well to recall that the Chief of the Imperial General Staff said, 'I don't see how, in modern warfare, we shall be able to use enormous numbers of men and horses if mustard gas is employed to the extent that I imagine it will be.'

The truth is that a large force of foot will not be able to arrive anywhere in the time necessary. Yet these crowds of men and horses still make up the bulk of the army, and have not been cut down to provide the money for less impotent types of force.

After the mobilization there was no longer any failure to recognize the facts. For I have never heard such concordance in criticism as occurred among the soldiers who watched it. The call for reform and progress seemed as universal as it was urgent. The pity is that the awakening waited until a year of economic crisis.

This, unfortunately, lent support to the argument that the military need to replace man-power by machine-power must now yield to the need of keeping soldiers in employment. The practical reply would seem to be that even the dole is but a fraction of what an infantry soldier costs the hard-pressed finances of his country. And all infantry beyond the proportion who can be provided with, and backed by, up-to-date armament are militarily superfluous. They are, indeed, merely a present charge on, and a potential pension-increase of, the national debt in case of war.

As for the proportion of infantry who remain, and are worth keeping, it is inconceivable that they will march on foot as a normal thing. Those who are used as guards and garrisons would be brought forward to their posts by rail or bus. The 'light infantry' required for mobile operations need special transport and training. I foresee such units being made up of a proportion of motor machine-gunners in little armoured carriers, a proportion of skirmishers

in 'baby' cars, and a reserve in six-wheeled lorries or buses.

The still prevailing practice of mixing motor vehicles and marching men in the same column obstructs mobility, increases wear and tear, and wastes petrol—with consequent waste of public money. And the present numerical size of battalions is not attuned to the development of light machine guns and automatic rifles. Modernized battalions might, with advantage, be little more than half the present war strength in men.

As for the training of such modern infantrymen, the guerrilla type of exercise introduced by the 4th Guards Brigade and the 56th (London) Territorial Division pointed the rational and natural way to develop a ruseful and resourceful type of men. Such exercises call on and develop the intelligence necessary to combat machine-gun nests. I have long argued that a course of guerrilla warfare would be the best means of teaching tactics. It was left for the Guards to prove it. Their schemes at Goodwood and in the Vale of White Horse were designed to revive the characteristic nature of British warfare, and to cure the 'tactical arthritis' caused by a too-long and too-slavish practice of Continental methods.

These methods, for all their technical thoroughness, tend to mould commanders into cogs of the machine. The need to-day is to breed tacticians. While it is unlikely that any future Continental war will see 'masses' of the 1914–18 type functioning effectively, it is still less likely that, even if such warfare were possible, it would fit the military problems and possible expeditions which lie on our army's horizon. In a 'mass' army it suffices if brigade and battalion commanders are competent military foremen, but for the 'British style' of warfare we want every one of them to be capable of acting on his own—to be, if possible, a potential Wellington or Clive.

But the greatest contrast to the negative lessons of the 1st Division mobilization came through the positive

experience of the '1st Brigade Royal Tank Corps'. The formation and first trial of a complete brigade of tanks under Brigadier C. Broad provided the brightest patch of the military year. It was a belated first instalment of that progress forecast by the Chief of the Imperial General Staff in 1927 when he spoke of creating 'armoured divisions', and declared them to be the only means of making mobility possible on the battlefield, and 'to revive the possibility of the art of generalship'. With all the weight of his authority he then declared that the human race would not again stand such losses as accrued in the last war, and that civilization itself would go to pieces if a war was fought on similar lines.

Those who have long urged the formation of an all-armoured force, freed of old-style impedimenta and given scope to practise mobile or, better still, Mongol tactics, had their long-awaited justification in September 1931. The exercises proved the most significant experiment since the war; indeed, in all tactical experiment since Sir John Moore created the Light Brigade for the struggle against Napoleon. The Imber Area may take its place with Shorncliffe Camp as a landmark in the history of the British Army. Indeed, with all sobriety one can go further in suggestion. For just as the Imber plateau stretches wider and higher than the Shorncliffe plateau, so may the tactics tried there—in affecting the future of armies and of land warfare.

Armoured mobility was at last applied in a true way—fitted to its nature. In previous years there had been a tendency to rely on armour to cover any frontal bludgeon stroke, as a guarantee against having to pay the price of your folly. This year armour was simply utilized as an additional security to the value of speed—to the power, which a tank force possesses, of swiftly circling round any strongly held position and piercing its weakest spots. Nor was that all. For the key idea of the new tank tactics became that of 'indirect approach'. And this was not

simple but cunningly compound. The light tanks—small, nimble and hard to hit—always sought to 'draw' the enemy by approaching from an unexpected direction. And when their stings had drawn the enemy's gun muzzles in one direction, the medium-tank punch would crash home from another direction.

These mixed tactics were helped by the fact that a mixed composition of tank units down to the company was at last adopted. The new tank brigade comprised one light-tank battalion and three 'mixed' battalions, each made up of three mixed companies and a section of close-support tanks. Each mixed company comprised a section of five medium, and a section of seven light tanks.

If such a mixture has a naval aspect, suggesting a squadron of battleships with its attendant destroyers, it has a Mongol ancestry. The combination makes possible the distracting and paralysing tactics by which Jenghiz Khan's incomparably mobile horsemen triumphed over the solid battle arrays of medieval Asia and Europe.

Yet less imagination is needed to see a modern parallel than to conjure up the past. Even though there were marked differences, there was a fundamental similarity between the manœuvres of this brigade of 'landships' and those of a battle fleet at sea. At Imber we truly saw the first 'fleet exercises' of the Royal Tank Corps.

The parallel became vivid not only in some of the formations which the tanks adopted, but also in the way they were controlled and manœuvred as a unity by wireless and flag signals. A new and simple two-letter code had been devised, and orders for manœuvre were given by it either through the display of combinations of two flags, one above the other, or by wirelessing the two letters in Morse. These signals covered a remarkably comprehensive range of orders. And they were supplemented by the radio telephony with which the tanks were fitted.

The tanks manœuvred either in close or open order. In close order there was twenty-five yards' interval between

the tanks. In open, or fighting, order the intervals between medium tanks were doubled, and one saw the light tanks of each company move out to 'protection stations'.

There was a peculiarly strong flavour of Mongol battle drill in two of the swift manœuvres that were made at 'signal-notice'. A particular pair of flags were shown which meant 'single-flank attack'; thereupon the medium section circled round to strike the enemy's flank, covered during its move by one light subsection, while the rest of the light section pinned the enemy with fire from its original position. Another pair of flags meant 'double-flank attack'; this time the bulk of the light section would move off to strike the opposite flank to that which the medium section was attacking.

The brigade training opened with a series of five exercises, each of which was carried out by the different battalions in turn. The opening feature of each exercise was in itself so novel as to grip one's attention, for it revealed a new system of 'leadership' that had been devised. The brigadier had as assistants, besides a brigade major and an orderly officer, three 'field officers', who acted in a similar way to Napoleon's expert aides-de-camp —and were mounted in light tanks. During the immediate advance to the battlefield the brigadier went ahead accompanied by two of these field officers and by the battalion commanders—all in tanks. Behind came a second party of tanks containing two company commanders from each battalion. Third came the brigade mass, which was temporarily commanded by the remaining field officer.

When the brigadier had made his reconnaissance and issued his orders, indicating the 'brigade centre line of attack', the battalion commanders would track away in their tanks to reconnoitre and choose their own centre lines. Meantime one of the field officers who accompanied the brigadier would drive back to take over the brigade mass and lead it forward, bringing it up at right

angles to the chosen brigade centre line. As the mass of tanks came up one saw the company commanders drive into position at the head of their companies and lead these along their respective centre lines.

The whole process went with a swing, and the tanks avoided any halt under fire. It was an extraordinary vision of the new warfare, if it also recalled the remote past, when knights in armour pranced and caracoled at the head of their mailed 'battles'. The likeness was increased by the particoloured signal flags which fluttered from the lance-like masts of the commanders' tanks. But it was far less obvious than the marshalling of medieval chivalry must have been. These modern mail-clad knights not only move faster and waste less time than their ancestors, but have grown skilled in using ground as cover.

The first of the exercises was really a test of such 'ground-craft', each battalion in turn moving in close order under cover of a ridge, and making changes of direction in order to avoid both impassable ground and hostile shell fire—the latter represented by blue screens and smoke puffs. Finally, the battalion had to cross the ridge in view of the enemy, changing its formation to reduce its vulnerability. Rapid execution of these various changes was the keynote of the exercise.

The second was a more advanced test, covering the deployment for battle. In the third we saw a normal type of manœuvre attack—against the artillery area of an enemy force. For, against an enemy in position, his artillery is now taken as the natural target of a tank punch rather than his infantry, who being spread out along a front presumably dotted with anti-tank guns, form a relatively unprofitable object to strike. The guiding principle is to strike in against the rear of the artillery area, or the administrative area, after a quick move round the enemy's flank. Even if the guns are turned in time to meet the indirect approach of this menace, there is no guarantee that they will be able to stem the steel attack. For it is

the grimly playful way of the nimble and relatively invisible light tanks to draw the enemy's fire just before the massive medium tanks debouch from a different direction and sweep down on the guns. Artillery experts expressed the opinion that, having turned once, it would hardly be possible for the guns to make a fresh turn in time.

In the fourth exercise, the tanks were set a harder and more complex problem. It was assumed that the enemy had been able to spare enough anti-tank guns from his front to put a screen of them round his artillery area. The anti-tank machine gun is certainly a more dangerous obstacle than the field gun. It is easier to conceal; its fire is harder to spot and more easily switched in a new direction. There is, however, some compensation in the fact that its sting is less fatal. And the gun is hard to move—unless it be mounted in a tank. The best antidote certainly lies in the light tank. For this offers only a small target and it is far more agile than the anti-tank gun; its two-man crew enjoy the protection of armour, while the crew of the anti-tank gun are exposed.

On these considerations the new 'anti-anti-tank gun' tactics are based. A few scattered guns can easily be overrun by a tank force in its onward surge. If there is a thick screen of them they have to be tackled more warily. In country where cover is good and fields of fire limited the light tanks may be counted on to carry out the 'sweeping' task, stealing upon the guns unseen, and smothering them with bursts of fire from various directions. But in open country, with its long fields of fire, a more methodical process may be necessary.

The key principle now adopted was always to approach from an unexpected quarter, so that the anti-tank guns would have to shift their position—and thus disclose themselves.

In the exercise that I witnessed, the enemy artillery area was covered by a five-mile semicircle of anti-tank guns west of Imber. The light battalion of the tank brigade was

assumed already to have cleared the north-west fringe, on Summer Down, of this anti-tank screen. The leading mixed battalion had moved up, and was lying in wait behind the shelter of the ridge. Its commander, according to the new system, was on ahead in his tank, accompanying the brigadier.

He now received orders to attack and clear the south-western sector of the enemy's anti-tank screen, with the help of an additional light company. The way would then be open for the mass of the brigade to be launched into the enemy's artillery area from the rear.

At 2.7 p.m. the brigadier's tank had roared up. At 2.10 p.m. his orders had been given out, and a field officer was dashing back in a tank to fetch the leading battalion. Meantime the battalion commander surveyed the ground and decided on his plan.

The co-operating light company was to circle out to the south-west across the low spurs, draw the enemy's fire, and pelt him in return. The leading mixed company was to strike in from W.N.W. behind the ridge and sweep astride the back of the chain of guns. The second would follow it, but turn south down the first spur. The third company would in turn sweep down the next spur, while the second company was rallying ready to descend a further spur.

At 2.15 p.m. these orders had been given. A few minutes later the battalion appeared in sight, deploying for action. At 2.26 p.m. the leading company had launched the attack. The close-support tanks followed on the heels of the mediums, and fired smoke shell to 'blanket' the more distant guns while the nearer ones were being dealt with. A fresh mixed company was then launched through at a fresh angle to smash the rear links in the anti-tank chain.

On such combination of tank-types and on instinctive co-operation between sub-units success would depend in war. That co-operation will be the fruit partly of trained

initiative and partly of a battle drill that revives the Mongol method.

In the fifth exercise the tanks were given the task of attacking a marching enemy column. As the last of the series, this was presumably regarded as the most advanced and difficult test of manœuvre. It may have been the most difficult manœuvre, but it was certainly not the hardest practical problem to solve—and would not be in war. One had only to recall the recent march of the mobilized 1st Division near Aldershot, slowly coiling its immense length and swollen bulk along the road, to realize what a target would be offered by a war-strength infantry division.

For the actual exercise the supposed infantry column was a comparatively small one, generously endowed for its size with anti-tank guns. It was marching south across Salisbury Plain. The tank brigade was coming from the east, and its advanced guard was checked by a screen of anti-tank guns, only 200 yards apart, which the marching column had put out along a ridge to cover its flank.

While the tank-brigade mass halted behind the next ridge the brigadier drove forward in his tank to join the light battalion and reconnoitre the situation. In a few minutes he sent back the order 'Right encircle' to the field officer in charge of the brigade mass. He then turned northward himself with his tank party and headed for a patch of woodland known as Tinkers Firs. The brigade mass also changed direction and moved to the same hiding place, covered by a company detached from the light battalion. The original advanced guard, staying where it was, now became a flank guard, and laid a smoke screen—'an artificial hill'—to cover the encircling manœuvre.

Arrived at Tinkers Firs, the brigadier found he was on a line with the tail of the marching column at Bowls Barrow. Detaching one of his three mixed battalions to attack the screen of anti-tank guns, he promptly led the brigade mass

in a swift circuit to the north round the enemy's tail, aiming to reach the high ground due west of it.

On reaching this high ground the brigadier turned his tank's bows to the east, to indicate the new direction, and made the signal 'Open order; attack' to his leading battalion. Thereby he launched it against what had been the far flank, and was still the unguarded flank of the enemy, whose anti-tank weapons would be more than fully occupied in meeting their immediate assailants.

The enemy's aircraft may have given warning of the original approach in time to put out an anti-tank screen, and this had been assumed as able to hold up the tank advanced guard. But having put out the anti-tank guns, the enemy could not easily shift them, and the separate attack launched against them was calculated to fix them beyond any possibility of such a shift.

First smothered with smoke and then flailed with bullets, it is unlikely that they would either be aware, or have a care, of the remote manœuvre being carried out by the rest of the tank brigade. For it is one of the oldest experiences of war that men who are being fired at from close range have eyes only for their immediate assailants, and do not care a 'tinker's curse' about what may be happening elsewhere.

Tank mobility can exploit this battle psychology. And in any case infantry cannot change their dispositions as quickly as tanks can change their direction. The master-key with which the tankman may open any barred door is his 360 degrees' range of manœuvre.

A blue-and-white flag above a forked red flag fluttered from the mast of the brigadier's tank—'Open order'. The signal was repeated—'Attack'. The leading tank battalion forthwith bore down on the enemy's defenceless western flank. Two companies ran along the edge of the marching column, firing into the mass of men, horses and wagons. It was easy to imagine the confusion, the panic, the stampede that would have occurred in real war.

The medium tanks may sometimes crash through the middle of the column, 'pulping' it as did the whippets to the three German battalions they caught at Cachy in April 1918. But one doubts whether such shock action could increase the chaos that would be caused by a driving storm of bullets at close range.

The light tanks in any case keep clear of the mêlée, 'holding the ring, and being ready to deal with any anti-tank weapons which may emerge. But it is hardly conceivable that even if any of these were at hand, they could be handled amid the confusion.

The speed with which this wide manœuvre was carried out was most impressive. In the case of that executed by the 2nd Battalion Royal Tank Corps the brigadier gave the order 'Right encircle' at 11.10 a.m. At 12.30 p.m. he gave the signal to close. Within one hour and twenty minutes the battalion had covered seven miles in its two bounds, delivered and completed its attack. A case of 'quick disposal', if of 'unhappy despatch'—for the enemy infantry.

After completing this series of exercises, three days were spent in exercise as a brigade. They began with brigade drill—one is tempted to call it drill by a brigade of machine-made Guards. If not always so symmetrical as on the Horse Guards Parade, it was far swifter—and hence more practical. We had the spectacle of one hundred and eighty tanks marching and countermarching, wheeling and deploying, as a single body—controlled by a single voice. The brigadier gave his successive orders by radio telephony from a tank that was sometimes, in the more open manœuvres, a mile or more distant from the recipients. Their execution, in alacrity and precision, certainly excelled the performance of infantry in open battle drill.

The next brigade exercise comprised a six-mile advance across country in contact formation, with two battalions 'up'. After the first bound had been completed, and a light tank screen put out beyond, the reserve battalion was

launched through at a different angle against a fresh objective.

In the third exercise the brigade 'made rings round' an infantry column in a literal sense, pinning it from the north while they circled round and clove it from the south. Increase of tentacles obviously increases the chance of successful pinning and the enemy's difficulty in parrying the eventual thrust. And the prevailing mist, wherein the tanks were often indistinguishable from bushes, would have put the infantry in an even more precarious situation. As the tanks emerged from the mist and swept forward, the glint of the sun on their tracks made an impression for which one observer found apt words by quoting what was written of a charge of Numidian horse —'the sparkle of their spearpoints coming out of the dust'.

The speed of the onsweep would have been still more impressive if armoured machine-gun carriers had not still been compelled to do duty as light tanks. Suited for working with infantry it was a strain on them not only to keep up but to keep ahead of this fast-moving tank force in its rapid bounds across steep spurs and rain-sodden ground. Only a bare dozen of the modern Mark II light tanks were yet available, and they were used mainly as 'mounts' for commanders and liaison officers. With their squat toad-like chassis surmounted by a high, narrow turret they are excellently designed for stealing up behind a bush or crest, and 'peeping' their turret machine guns over it. To watch them sweep forward is to perceive the menace that their speed, agility and unobtrusiveness combined threaten to infantry and artillery. They are, in truth, an ominously looming cloud on the horizon of all old-style forces.

But for that menace to be fulfilled these new and comparatively cheap machines must be provided in sufficient quantity to form a tactical cloud. In driblets they may be merely useful, whereas in a deluge they would be decisive. To provide the deluge we must, however, face the necessity of finding the money by substitution. A light tank with its

crew of two men, has more fire-power, and far more effective striking power than an infantry section. Its annual cost would be less than half.

In quantity of such machines lies one means to discount the inevitable toll taken by anti-tank guns. The other means lies in the reborn Mongol tactics which were so well brought out in the exercises. It may be said that these exercises were set and selected by the Tank Corps. The answer is that they were set to test the tank units, and, as designed, were a harder test than these would be likely to meet on any battlefield of the present or of the near future.

At present anti-tank guns are mostly represented by green flags—which are cheap to provide and easy to wave —whereas an effective weapon, complete with tractor and ammunition trailer, costs nearly as much as, and is far less agile than, the light tank. Even if such weapons were manufactured, I cannot see how any infantry division could be provided with enough to form the immense circular screen that would be necessary for its protection. Taking the march of the mobilized 1st Division as an example, a screen at least thirty miles round would be required. This would have to be expanded considerably if the division had to march on a single road, if the columns became strung out, and still more if the screen were extended to embrace the routes of supply.

Now in the test attack on a marching column practised by the tank brigade, the enemy's screen was composed of anti-tank guns spaced at two hundred yards' interval. On this basis no less than 270 anti-tank guns would be required, as a minimum, to be 'in action' at any time, with at least as many on 'wheels' to maintain the screen as it advanced and to provide for contingencies. Such figures give some idea of the almost insuperable problem of protecting a division on the march against tank attack. Moreover even on such a basis the screen would be but a fragile single line, that would stand little chance against a concentrated tank punch at any point. Tank mobility

provides the means of striking within a few hours at any point on the circumference. It provides a 360 degrees' choice of the point of attack.

With the development of independent tank forces the old linear warfare is replaced by circular warfare.

Thus, to sum up, the tank brigade proved capable of creating a new system of tactics suited to its mobility and promising an effective antidote to any immobile anti-tank agents. The tactics truly fulfilled the Mongol ideal. Perhaps in movement also, now that order has been obtained, it might be possible to go further and develop 'ordered disorder'. Officers who flew over the brigade significantly said that from the air it made a very visible if fast-moving target so long as it kept in drill formations. But when the formation broke up as the attack progressed the tanks 'simply disappeared' from observation. The moral would seem to be the cultivation of controlled irregularity in the approach as well as in the successive wasp-like attacks.

While 'variability'—the power to vary the direction of attack—was the dominant feature of the exercises carried out by the tanks, their invisibility was scarcely less noteworthy. To think of Salisbury Plain is to conjure up a picture of country where tanks can move fast but can scarcely hide. The picture was contradicted by the reality. Even though one knew the exact, and small, area in which they were working, and was following them in a car, it was difficult to locate them. Time after time companies of tanks were swallowed up in some fold of the ground, to emerge suddenly close to their prey. While the noise of their tracks gave some warning of their stealthy approach, it was a deceptive noise to locate, and the presence of so large a number of tanks confused the listener.

As for controllability the progress achieved was remarkable when one considered that the new creation was only a few weeks old. And further training would, obviously, develop it. But the fact of supreme significance came through comparison. For a tank brigade is the only formation that

can, in the strict sense, be controlled and manœuvred on the battlefield. With an infantry formation, even a local tactical manœuvre can scarcely be accomplished in the day. With a tank brigade a wide manœuvre is a matter of hours only; and a local manœuvre, of minutes.

To appreciate what this may mean, let us for once lift our thought on to a higher plane than the question of tank attack *versus* anti-tank defence. Let us, instead, consider the tank as essentially a means of moving fire-power quickly to any spot, if also of bringing it closer to the target than can be risked by weapons which are handled by unprotected crews. For this is its fundamental value, and would remain, even if an omnipotent armour-piercing weapon was invented. An old-style unit cannot, as a rule, be expected to make more than one attack in a day's battle, and, once committed, cannot be shifted to a fresh sector. Thus it is practically limited to what one may call 'one-point' use of its fire-power. In contrast, a tank unit is capable of a 'several-point' use of its fire-power, without special strain or risk. The utility of a tank formation, such as a brigade, has a similar proportion in comparison with an old-style formation. And this sense of proportion ought, therefore, to govern any estimate of their respective economic value for military purposes.

The tank as a 'fire-mover' gives a fresh meaning to Napoleon's acute dictum that force is mass multiplied by velocity. This is the true way to calculate force. We must also remember that material effect is multiplied by moral effect. The fact that the tank can bring its fire so quickly to a spot, and from an unexpected direction, morally multiplies the value of its fire—even apart from any qualms which its ugly appearance may cause. Hence the real force innate in tanks is the cube of mass, velocity and surprise. They give a commander the chance of fulfilling in a way hitherto unconceived Forrest's famous yet simple recipe for success, that of 'getting there first with the most' —fire and fear.

CHAPTER XII

STEPS TO RECOVERY

1932–35

The training season of 1932 saw further steps towards solving the twentieth-century military problem of immobility. In the sphere of training, as distinct from the sphere of *material*, it marked perhaps the greatest advance since the war. Instead of the former obstructive tendency to talk in terms of man *v.* machine, one found a growing realization that mind *and* machine are complementary needs, and a widening attempt to develop minds capable of the masterful use of mechanical weapons. Such was the musket, equally with the latest tank, with only the difference that the latter needs more application of intelligence to profit by its value.

The year's progress was not restricted to the experimental units which handle the newest weapons. With the Tank Brigade there was continued practice towards recreating a mobile arm of decision—and continued progress despite an unpractical attempt to make these high-speed tanks team with ultra low-speed infantry brigades. But 1932 was also, indeed more, a year of infantry revival, with the aim of enabling the men who fight on foot to overcome the machine-gun obstacle, and with the idea that by a craftier use of ground they may avoid being driven underground. The need to try this new line of progress was certainly emphasized by the Army's prevailing deficiency in tanks and guns.

During the winter, committees were formed in the several Commands to study the reform of the soldier's dress and equipment, and they made bold proposals for

lightening and loosening it. Better still, instead of waiting until the War Office machinery had completed its inevitably slow motion and produced a new pattern, some brigades initiated reforms of their own during the summer for experimental test. The 3rd at Bordon, under Brigadier Dalby, marched and fought their seasonal battles as truly 'light infantry', carrying an economic load of less than a third of their body weight. Simply by adaptation and reduction of the existing kit, pending the design and issue of new, the weight was brought down from 56 lb. to barely 35 lb. The difference was even greater when compared with the 80 lb. with which the soldier was burdened in the war—a burden at which even a mule would shy.

The men in this brigade simply wore the web belt and braces, with pack slung in rucksack style, and waterproof cape rolled below it. Nothing dangled below the waist to hamper movement. Bayonet and scabbard were discarded as well as haversack, and the water bottle was carried in the pack along with the small kit. The benefit was strikingly shown in one exercise near Midhurst, where the men covered 31 miles in the final twenty-four hours of a three-day exercise, fought two 'battles', and yet arrived back in splendid form. The number of sick was so insignificant as to be a significant contrast to what one has known with other troops in lesser tasks with the normal load.

The 2nd Infantry Brigade under Brigadier Buchanan adopted a 'light fighting order' which reduced the load to a mere 34 lb. In this case, belt, braces and pouches were also discarded, and instead of these inconvenient 'chest protectors' the men carried the ammunition they needed in their pockets. The water bottle was ingeniously fixed on top of the pack, so that while out of the way it was easily accessible.

This new mobility of body supplemented a new mobility of mind. For the 1932 exercises showed, above all, that the art of command, as contrasted with the cog-like functioning of trench warfare, was being cultivated anew. The

spirit of the best British tradition emerged through the rubble of the past half-century, through the dust and ashes of that Continental doctrine of mass which rose out of the fallacious experience of the 1870 war, and broke under its own weight in 1914–18, almost burying our civilization in its collapse.

Anyone who has had the opportunity to study the diaries and memoranda of some of our chief commanders in the last war may have observed the evident struggle that went on between their instinctive common sense, a racial inheritance, and the pedantic code of so-called principles that they had learnt from pre-war lectures and textbooks. In the light of our present knowledge of the war, one can note that whenever such a commander trusted to his own common sense, he usually did the right thing, while if he checked himself and recalled the code, he too often fell into the errors which produced such untraditional battues as the Somme and Passchendaele. And it is also to be seen that the commanders least wedded to Continental pedantry were those who were in the closest touch with troops—who knew them as men, not merely as pieces of the military chessboard.

The revelations and analyses contained in the histories of the war have produced a healthy doubt of the soundness of our recent models, an urge to rediscover the secrets of our own success in past centuries and to adapt what we discover to modern conditions. And in the 1932 exercises one often found commanders thinking for themselves instead of trying to repeat the formulas of the textbooks. If they took a leaf from anything foreign, it was from such opponents as have taught us a painful lesson as to how superior numbers can be offset by superior individual skill.

It was by taking a lesson from the American backwoodsmen in the War of Independence that we created the Light Division, and that division was the seed of our harvest in the Peninsular War. And now, in the year of grace 1932, we began in our training to apply the experi-

ence of the Boer War, selecting the positive lessons that our unconventional foes then taught us, and blending them with the negative lessons that were so liberally administered in the World War. The compound, as poured out in the many mobile and guerrilla exercises of this year, was both older and newer than its ingredients. It had the flavour of our feats under Moore and Wellington, while it was coloured by post-1918 equipment. It might still be weak beer, but it was better than the muddy water of 1914–18. And the more we go on brewing, the better will be the beer.

Such exercises pit mind against mind. They compel not only commanders, but sub-unit leaders, and even individual men, to develop their intelligence and initiative. The soldier who is fitted to contend against the wiles of the crafty irregular, whose life depends on his cunning, will be mentally equipped to cope with the far more straightforward problems involved in meeting a civilized army of conventional pattern and method.

Moreover, the 'colonial war' problem is the one most characteristic of our history—which, unfortunately, tells us how often our commanders have failed to solve it. Our Army has always done well when faced with overwhelming numbers; it has often failed to distinguish itself when weight has been on our side. In priding ourselves on a Mons, it is wise not to forget our Majubas. The popular catch-phrase of to-day about our Army being essentially for policing the Empire is apt to breed dangerous delusions as to the tactics and equipment required. We should not confuse purpose and method. The old-style Army is no more capable of coping with mobile guerrilla raiders than is the policeman on his beat to deal with motor bandits.

Experience in the Middle East suggests that light-tank forces and armoured cars are, with aircraft, the military means most suited to check and punish raiders, and worth ten times their weight in infantry. But light tanks are still

absurdly few, and such a military 'flying squad' has yet to be created. In the meantime, something may be done by developing the mobility of our infantry, which in any case will form the pivots on which the armoured troops operate. And the more mobile these pivots themselves, the better they can co-operate.

For the tactical renaissance, credit was due to the General Staff, who gave the opening by making 'colonial' expeditions the new orientation of our training; to the Commands which developed the opportunity; and to the divisional and brigade commanders who, in varying degree, took advantage of this opportunity to carry out resourceful and ruseful exercises. The Aldershot area during August and September was alive with irregular forces that ranged from mounted Boer Commandos to a handful of armed insurgents with a price on their individual heads and a price-ticket for identification in their pockets. One such scheme was aptly headed by the immortal quotation from Mr. Dooley—'Tis only armies that fights in the open. Nations fight behind trees and rocks.' Efforts were made to bring out the tactical powers of junior officers by spiriting away their seniors, and by giving them small mixed packets to command.

What further can be done to fertilize the growth of surprise and mobility in the field of training? First, to provide the material means of mobility in which the Army is still seriously lacking. Second, care to insure that scope for these elements is provided in all schemes. The more we lack an adequate equipment of lock-picking tools—artillery and tanks—the more essential it is to develop the alternative, less tangible, means of forcing an entry. For in taking the watchman off his guard lies the only remaining chance of success in a defence-breaking operation.

It is especially important that those who set schemes should take care to provide the commanders with a choice of alternative objectives through which to attain their objects. For in this power of *variability* lies the best chance

of deceiving and surprising an opponent, and the only chance of achieving true concentration—superiority at the decisive place. Unless a commander has a choice of objectives, he has a poor chance of gaining any objective. This truth, although obscured by the shallow thought and stereotyped doctrines of the last century, lies deep-rooted in the history of war. Through overlooking it we fell into so many bogs in 1914–18.

It is, after all, mere common sense. For, if the enemy is sure as to your objective, he has the best possible chance of guarding himself—and blunting your weapon. If, in contrast, you take a line that offers alternative objectives you inevitably distract his mind and forces. You put him on 'the horns of a dilemma'. Without such power to vary, you can only gain your end by dividing your forces—which is a far more risky and wasteful method of distraction.

In actual war a commander, if he be wise, will take a line that threatens, and offers to himself, alternative objectives. In mimic war it is the responsibility of those who set the scheme to provide them.

The lesson is one that our official text-books fail to bring out. But their silence is hardly surprising. Official manuals, by the nature of their compilation, are merely registers of prevailing practice, not the log-books of a scientific study of war—a form of research that is hardly begun. Although one finds that the principle of variability—in the use of alternative objectives—has been constantly in operation, and was more or less intuitively applied by several of the Great Captains, it has, curiously, escaped the notice of the theorists of war throughout the ages, and so has not until recently been defined.

In my own studies, I must confess, the first clue to it came as late as 1929, when exploring the pattern of Sherman's operations in the decisive campaign of the American Civil War. Subsequent test by history brought ample confirmation of its effect and universality, but almost the

only hint of it in military theory was found in the writings of Bourcet, whose privately circulated manuscript was probably the most important source of the young Napoleon Bonaparte's military knowledge. The significance of this fact adds to the strangeness of the general oversight. If one has been the means of disinterring such a fundamental truth, and defining it as a principle, one can hardly flatter oneself on the discovery—since it is so obviously rooted in common sense, and of such manifest application in ordinary life. Rather does it reflect the merely reproductive trend of military thought.

But, having at last perceived the principle, it has been interesting to observe its working in present exercises as well as in past wars. And it was significant that the most fruitful of the 1932 exercises were those in which a condition of variability existed. I watched several schemes, neatly framed, where each side had a single unmistakable objective. Despite their apparent promise, they ended in frustration and stalemate. In contrast were the unmistakable results obtained in several exercises where alternative objectives were offered and one was definitely attained. There was an interesting play upon this theme in a Guards Brigade exercise that re-created the historic 25th of April, 1915, with a landing on Gallipoli-in-Mid-Surrey. Despite unusual initiative among subordinate leaders, a contrast to the failings remarked in the official history of Gallipoli, the course of events too clearly suggested that, in its issue, this new invasion would have been a repetition of the original. High hopes would most surely have subsided into stalemate; visions of the minarets of Basingstoke-Stamboul would have shrunk to a close-up and low-down view of an opposing trench line. The causes lay in a too obvious interpretation of 'concentration'—that blessed word from which mixed blessings flow.

One outstanding lesson of the original Gallipoli landing is that its initial success was mainly due to the wide distribution of the landing force at a large number of points.

For this seeming failure to concentrate his efforts Sir Ian Hamilton was censured at the time by pedantic critics. But, in fact, as we now know, he twice achieved a surprise effect such as none of the commanders in France ever did. By apparent dispersion, and by avoiding the obvious, the British commander realized an overwhelming concentration, although, unhappily, the opportunity was allowed to slip away through failure to exploit the local openings. In the 1932 'revival' there was no such failure. But a higher error was committed. For, like the 29th Division in 1915, the invaders concentrated their effort on three central beaches—and thus helped their opponents to concentrate against them. Moreover, unlike the 29th Division, they did not attempt any distraction or feint landings elsewhere. Thus an old lesson was brought out with a new force.

Another outstanding lesson of the 1915 landing was the need for elasticity in the plan. It might have made all the difference if a 'floating' reserve had been available to reinforce along the line of least resistance or to develop a fresh and unexpected line. In the 1932 'landing' there was again an absence of any attempt to develop a new line when the first was blocked. Intent, above all, on security the commander used his reserve to safeguard his original landing places. The result was that by the second morning the invaders were so well concentrated that their opponents could concentrate undisturbed to stop them.

The most instructive of all the year's lessons in the meaning of concentration came, however, in the final Aldershot exercise. It was a positive lesson. The general idea was that the manufacturing parts of 'Westland' depended for their essential water supply on a pipe-line, which ran uncomfortably close to the 'Eastland' frontier. Westland had been sinking this pipe deep underground, but four stretches of it along an arc from Fleet to Crowthorne were still exposed.

It was interesting to find a scheme in which the object was essentially to gain what was really an 'economic' objective. For the growing importance of economic, as distinct from purely military, objectives is characteristic of modern war. And the most decisive strategists have been those who, since Sherman in the first modern war, perceived the paralysing effect of striking at the immovable sources of power, not merely at elusive bodies of troops.

But the method was even more illuminating than the purpose. Outwardly, the Westlanders had the simpler problem to solve. With almost equal forces, they were in a central position, and had only to prevent instead of achieving. As the way of prevention they took as their aim that of 'destroying the Eastern Force'. This simple and singleminded intention is so regularly given in orders that, by familiarity, it is apt to sound more simple than it is in reality.

In contrast, the Eastlanders had not only to take the offensive—so difficult in modern war for unarmoured forces—but to seize a portion of the pipe-line right under the enemy's nose, hold it for several hours while it was being demolished, and then make their withdrawal without being cut off. The task was to be compared not with a tip-and-run raid, where the thief merely breaks a window, grabs the booty, and bolts, but with the task of a burglar who has to cut a hole in a safe and make his get-away with the householder on the premises.

In attempting this formidable task, Brigadier Wavell's chief asset was his freedom to choose which of the four stretches of pipe-line he might seize. His success would largely turn on his ingenuity in exploiting this power of variability. And the fact that he had four possible objectives was by far the greatest handicap which his opponent suffered. It proved a decisive handicap.

In choosing between the four, Brigadier Wavell gave his preference to the north central one, not only because

it was less difficult of access, and offered the best protective flanks for his get-away, but because, by its very obviousness, it might be the least expected.

He sought to deceive his opponents by feint moves against the extreme northern and southern objectives, and to disperse their forces by a wide distribution of his own in the main move. The Warwicks and the Loyals advanced openly as two detached wings, while the Somersets, followed by the Suffolks, trickled through the centre under cover towards the real objective. The Warwicks, moreover, served as a pivot on which, if the original move went astray, he could develop a fresh manœuvre against the most northern objective. Thus his dispositions had flexibility and he kept the power of variability. Moreover, his dispositions were an object-lesson in the true meaning of 'concentration'. Like Napoleon's army, the Eastland force was *réuni*—assembled in potentiality but not in physical unity, in a solid lump.

Fortune eventually favoured the man who was brave enough to risk a preliminary dispersion to achieve a concentrated effect. At the start it played him foul. The mist prevented the enemy's air observers seeing, and drawing false deductions from, his opening feint. And the enemy's clever network of ground observers quickly put them on the right trail. So the Eastland commander's deception failed. And at one time it looked as if he, like Sherman at Kenesaw, would pay forfeit for trying even once to make a geographically direct approach in the hope that the obvious would be unexpected. For the enemy had half their force in reserve close to, and ready to rush up in buses to the threatened sector.

But, where deception failed, his plan was saved by 'distraction'—in the sense of drawing apart. For although the enemy felt almost certain as to his plan, his wide distribution made them uneasy, and so delayed them in taking preventive measures. And even when, rather late, they sent up their reserve, uncertainty led them to send

half to each of the two centre sectors on either side of the Basingstoke Canal.

Long before this the Somersets, skilfully infiltrating through the woods near the canal, had stalked and scuppered the machine guns which here, because of bad visibility, formed an insecure barrier-chain. And Brigadier Wavell, finding the gate half open, promptly launched the Somersets and Suffolks to the attack—discarding a prearranged artillery plan to gain rapidity. The advance swept over the pipe-line, and firmly secured it, while the opposing force was still confused. This coup, in which the enemy commander was captured and part of his force disintegrated, paralysed the remainder long enough to thwart any possibility of timely counter-action.

Surprise, in a subtle form, had achieved what concentration of material force could never have done. Even in the opening attempt to create a fog of war, that failed because of a natural fog, there was a potential lesson. It is often said that the development of air observation and, more recently, of wireless interception, have made surprise impossible. I believe this view to be a fallacy. Air observation may be a check on the cruder forms of surprise, but it is an incentive to the more subtle—to deceiving the enemy's eyes so that the more trust he reposes on what they tell him, the more readily they can be made to mislead him. So also with wireless interception the one practical answer lies in *wireless deception.* It should be organized as carefully as the proper service of communication, and as a separate branch with picked personnel.

While the final Aldershot command exercise threw into bright relief the budding renaissance of the military art, an earlier exercise had cast a revealing and less reassuring light upon the present material difficulties of the Army. It brought home to many observers the immense resisting power that a well-placed defence offers to the offensive equipment that we possess to-day. The direct purpose of the exercise was, first to practise the artillery of the 2nd

Division in supporting an attack; second, to practise part of the 4th Guards' Brigade in field defences.

The Guards are unique, as far as I know, in maintaining at Pirbright what is humorously termed a 'trench-warfare museum'. To me it seems a proof of an uncommonly realistic outlook. Like the ancient Egyptians, they see wisdom in having a mummy at the feast, a remedy against the optimistic delusions that have overtaken most armies in peace time—as history shows only too well.

In this exercise on the Fox Hills, the 2nd Grenadier and 2nd Coldstream Guards showed how well they could site and construct field defences at short notice, skilfully covering the more vulnerable points with wire entanglements. The way these trenches were sited, and even more the way they were camouflaged with twigs and leaves, together with the artful use of dummy trenches, made the problem of the attackers all the more difficult.

Within the imposed limitations, the attacking commander did all that skill could in conducting this deliberate attack on an unshaken and strongly posted enemy. Strong patrols were pushed forward in the dark to seize points from which artillery observation could be obtained in the daylight. But the enemy's outlying posts caused trouble, and the difficulties of locating his main defences in this thick country proved formidable. In fact, neither reconnaissance nor air photographs succeeded in revealing them with any exactness—save the purposeful 'dummy' trenches! Thus, as on the fateful 1st July, 1916, uncut wire and undetected machine guns remained to take toll of the assailants.

At last, late in the afternoon, one battalion was launched to the attack, covered by a creeping barrage from all three artillery brigades of the division. Three-quarters of an hour later two of the brigades switched their fire to provide a similar barrage to cover the attack of another battalion, well to the left. But intact machine guns were firing from the flanks or through the barrage at the advancing

lines of infantry. The directors, with a sense of realism which did them credit, adjudged that both attacks had collapsed. It would probably have needed a day's delay to locate the defences clearly enough to deal with them effectively. But such delay would have enabled the defenders to strengthen themselves further—as they did so often in 1914–18. Little imagination was needed to picture the swathes of dead that would have strewn the battlefield if the hostile machine guns had been firing live bullets. And the vision was disturbing in reflection.

Yet here wise leadership had only committed one battalion at the time, and two in all. There are twelve in the British division—with only forty-eight pieces of field artillery to cover and aid them. To launch more infantry would only have meant more, and more useless, slaughter. It was at least better that the remaining ten battalions should rest safely in reserve. But what is the value of such a vast surplus?

One wondered if the public has any idea how weakly armed the army is in proportion to its infantry bulk. Government spokesmen, certainly, have often dwelt on the way our army has been reduced in comparison with others, and with even its own small pre-war scale. There is much truth in these reminders. But there is a much graver and deeper truth that they fail to bring out. Perhaps because, lacking military knowledge, they do not realize it.

For these statesmen speak of strength in terms of numbers, of man-power. Whereas in modern war, even against tribesmen, it is fire-power that counts.

Does either the public or its ministerial representatives appreciate how hopelessly inadequate is the fire-power of our Army for the conditions of modern war? Have they any perception of the fact that if the Army had to take the field as at present equipped it would be courting a second Somme? Nay, a worse one. For, inadequate as the artillery preparation proved in that tragic July eighteen

years ago, our artillery resources were much greater in proportion to the numbers of the infantry than to-day. To provide even a thin barrage, at least one gun for every twenty yards of frontage is required. And the whole artillery of the division can only provide such a barrage for one battalion—out of twelve! These facts need to be clearly pointed out. Thanks to improved artillery methods, the divisional artillery may, after a short interval, switch its fire and provide a similar barrage to cover the attack of another battalion in turn. But this does not go far to solve the problem how the other ten battalions are to advance, or even to be protected while sitting still.

The public have an hazy idea that tanks will do the trick, and that nowadays we have enough tanks to make up any under-weight of shells. Do they realize that the Army has only enough tanks to form one brigade? These would not go far to meet the needs of the five divisions of regular infantry, let alone the fourteen Territorial divisions, that we still strive to maintain. And of that solitary brigade of tanks, only a fraction of its machines are sufficiently modern to be fit for active service.

1933

As so commonly happens in human affairs, especially in the military sphere, there was a partial reaction in 1933 after the progress of 1932. A rather depressing augury was the news in the autumn that the tank units would not be reassembled the following year for training as a brigade. Since 1930, tanks had rarely been available to take part in the normal infantry brigade and divisional exercises, which had thus lacked a fully modern note. This lack had brought a danger that the infantry, through training in a tankless world, might take liberties that were inconsistent with the realities of modern war; but, if the decision to parcel out the tanks among them for a year was a useful corrective in this way, it meant a regrettable interruption

in the development of tank-formation tactics—and emphasized the prevailing paucity of tanks in the Army.

The New Year brought a fresh blow—the 'de-mechanizing' of the 6th Infantry Brigade at Aldershot. The official explanation was that the trials which 'had been carried out successfully with two infantry brigades during the past two years had now reached a stage at which only one brigade was required to complete the experiment'. This explanation was not very convincing, and was cold comfort to the officers and men of the brigade. After being trained in the use of mechanized machine guns and mortars for several years, it was a dreary prospect to go back to unhandy horse-drawn limbers. And the logic of the decision seemed curious. Since it was admitted that the experiment had been successful enough to justify a programme of gradual mechanization, one could hardly follow the reasoning that inspired a reversion, even if temporary, to the old style. Why de-mechanize, one asked, if you are intending to re-mechanize? During the interval keenness will be damped and training will grow rusty. Moreover, the gorse-strewn heathland around Aldershot offers a better testing ground for infantry experiments than the bare expanse of Salisbury Plain, where the surviving experimental brigade would continue its trials.

The explanation, in fact, masked a decision by higher authority that went contrary to the views of many of the officers who had been engaged in the trials—the decision in effect that armoured machine-gun carriers were not to be used as fighting vehicles, even to the extent of firing their weapons from the halted vehicle. They were merely to be tractors for bringing up the limbers on which the machine guns, like other equipment, were carried. The de-mechanizing of the 6th Brigade enabled the 7th Brigade to be endowed with sufficient Carden-Loyds to serve as tractors for the whole of the first-line transport, pending the provision of specially designed vehicles for the purpose.

A handful of such vehicles, known as 'utility tractors', made their appearance with the brigade in the summer; trial certainly showed that a diminutive machine of this kind was superior in tractive capacity, more handy, and less noticeable than a team of draught horses. As a result, their numbers were much increased, and their efficiency thoroughly proved, in 1933. But it is now a question whether a low four-wheeled vehicle with low-pressure tyres would not serve the same purpose, and perhaps more satisfactorily over rough and stony ground, at a smaller cost.

If this mechanization of the infantry battalion's transport, now decided upon, will improve its mobility in many ways, it does not meet the problem of enabling the infantry to advance in face of fire. The discontinuance of the armoured machine-gun carrier meant that the promising idea of 'protected infantry mobility' in the attack was dropped—if only for a time. For now, in 1935, after two more years' reflection on the discarded lesson, the method is to be revived and experiments resumed.

The year 1932 had also brought another opportunity, of profiting by lessons, that was not fully redeemed in 1933. For a committee of half a dozen of the more distinguished younger generals was formed, under Lieut.-General Sir Walter Kirke's chairmanship, to investigate the lessons of the war and the question whether they were being applied in this Army's present-day training. It is said that the inquiry was prompted by the shock caused in the highest quarters by the recently published official histories of the Somme and of Suvla, with their revelation of astounding errors in matters of elementary military judgment.

When the inquiry was set on foot one heard caustic comments to the effect that fourteen years after the war was rather late to begin studying its lessons. To such a criticism the obvious answer was 'better late than never'; but not merely that. For at such a distance from the event,

fuller data are available, a more detached spirit prevails, and much of the varnish has worn off. Thus, there was a better promise of accurate and honest analysis. That promise was amply fulfilled, and it is certain that the report of the committee made a strong impression on those who read it. One heard the comment that it ought to be digested by every young officer who might command in war and had yet to experience war himself. Unfortunately, instead of being published, extracts alone were printed, and these even were issued only down to battalion commanders—the senior officers who should need its guidance least. Many soldiers wondered why such excessive discretion should have been shown in what is a matter of history. As it was, the dissemination of this distilled wisdom depended on the inclination of individual seniors, and naturally varied, so that while the officers in one formation or unit received a helpful sprinkling, others were untouched.

The Northern Command, notably, issued instructions for future training which embodied the more important of these newly assimilated lessons of the war. The keynote was the paramount need for surprise, both in attack and defence, and the disastrous results of failure to secure it. And they enunciated, as the outstanding lesson of the war, what one had earlier defined in the axiom that no attack in modern war is practicable or likely to succeed against an enemy in position unless his resisting power has already been paralysed either by some form of surprise or by preponderating fire, powerful enough to produce the effect of surprise. If this truth had been realized by the war generation of commanders many ruinous futilities would have been avoided.

But these new instructions did not rest content with stating a negative rule, however important; they gave specific guidance as to the way in which surprise was to be sought, and its advantage seized. They showed none of the old reluctance towards night attacks which made

soldiers incur certain slaughter by daylight rather than run a risk of confusion by night. Attack by night was recommended as being often the most economical way: instead of shrinking from the risk, this was to be overcome by thorough training to develop the 'night sense' of the troops. In defence, too, surprise was to be developed. The artilleryman's desire for good ground observation was to be subordinated to the infantryman's need of cover—the surprise effect of the hidden machine gun is the greatest asset that the defence can have for demoralizing the assailant.

The Northern Command instructions were no less significant in their efforts to ensure that the opportunities created by surprise should be seized, without giving the enemy time to recover his breath. The whole question of gaining information quickly was to be studied more thoroughly. Commanders were to have their headquarters well forward, so that they could see things for themselves promptly and with reasonable safety. 'Inquisitiveness' was to come first in the thoughts of the forward troops, so as not to waste time if the attack were held up on some parts of the front.

The issue of instructions such as these, freshly drawn from the fount of experience, revived hope that the coming year might bear fruit in the field of tactical training, even if doomed to barrenness in the field of mechanization. I did not see the training in the Northern Command, but certainly elsewhere that hope was largely disappointed. Instead of the new rule of surprise alike in attack and defence being fulfilled, the majority of the exercises were apparently treated as occasions for the exception that might prove the rule—at least under peace conditions. And even when surprise was attempted, it was apt to be of a crudely obvious form. To anyone who has studied the profound subtlety and variety of the ruses employed to produce such surprise effects as those of August 8, 1918, in France, or September 19 in Palestine, it became

only too clear that the art of surprise has fallen lamentably into neglect. Moreover, the 'colonial war' exercises, which should have given scope for their art, tended to reveal an ominous lack of mental elasticity and also of self-confidence among a number of the senior officers. This was a matter of general remark.

On the other hand, they undoubtedly proved a stimulus to the tactical sense of the younger officers and N.C.O.'s. Among the Aldershot troops especially there was a real access of individual interest. The guerrilla exercises of the 1st Division gave the junior leader and man a scope for battle-craft such as he has never enjoyed on such a scale. The three weeks' continuous campaign of the 2nd Division on Salisbury Plain, in wire-encircled camps liable to raids day or night, brought an exhilarating atmosphere of active service to men few of whom were old enough to remember the war.

In the 3rd Division, the men of the 7th Infantry Brigade had all the fun that came from being the only brigade now provided with modern equipment. If the 4th Division was more bare than any of such up-to-date tools, it at least had the compensation of working in 'infantry country' where the old-style fighting man does not feel so helpless in face of machine-weapons.

It was only when one rose above the dust of 'dog-fights', and visualized the possibility that our Army might have to take the field as it is to-day, that one felt the full force of the depression in the atmosphere. To anyone who paused to reflect on the lessons of the last war, let alone the portents of the future, the atmosphere of the operations was often blatantly unreal.

Not long before an eminent commander had described our existing divisions as no better than 'suicide clubs'. Other generals have expressed a similar view in equally emphatic terms. Unfortunately, service tradition and a natural regard for their own careers hinder them from stating the facts openly. They have seemed also to fear

the effect of the truth on the morale of the young soldiers, who would have to bear the brunt if war came. Further, there is an instinctive aversion to disclosing the hollowness of the structure to the outside public.

Thus they have clung to the hope of an unforseeable windfall from the public purse, that might enable them to modernize the Army's equipment. There were many sentimental attachments, apart from administrative fetters, to deter them from making radical improvements on the available money at the expense of existing interests and units—as would have been inevitable. There were certainly some among our military chiefs who might have had the resolution to make the necessary changes, if they had had a free hand. But they did not enjoy this, and the internal difficulties of the system are such that one conservative soldier can outweigh the efforts of three progressives. It is a commonplace among soldiers that no great reform can be carried through except by the political chief—and then only at the rare intervals when a Cardwell or a Haldane arises. The Army has waited long for a third in the succession. Meantime the causes of depression have accumulated, the most prominent being the tardiness of modernization and the paucity of up-to-date equipment.

A seven-year period has a proverbial significance in the stages of a lifetime. Such a period was completed early in 1933, when the reigning Chief of the Imperial General Staff laid down the office he had held since 1926. It was a natural moment for stocktaking, and to anyone who had not kept close touch with figures the result must have been rather surprising. Despite the long-recognized inadequacy of the fire-support to the infantry division—only enough for a barrage to cover one battalion—its artillery strength remained as in 1926. The mechanization of the field artillery had already been begun then, and two brigades had been converted; by 1933 only two more had been mechanized out of a total of twenty-eight. Yet

the annual cost of a mechanized brigade is actually less than that of a horsed brigade, so that even the taxpayer would seem to be a loser by the delay.

There were only four battalions of tanks in 1926; seven years later there were still only four. These were still equipped with the same early type of medium tank, now seven years older. Far from any sign of the 'armoured *divisions*' foreshadowed in the historic Tidworth address of 1927, the one brigade provisionally formed had been broken up on the eve of 1933. Yet one hundred and thirty-six infantry battalions were still maintained. Also, twenty cavalry regiments, only two of which had been changed from horsed to armoured-car regiments in the interval.

Thus one could see that the Army of 1933 was still substantially a pre-1914 army of cannon-fodder, pitting unshielded flesh and blood against that most deadly 'mechanized' weapon—the machine gun. Even the Crimean Army, historic for its inefficiency, lagged far less behind the military conditions of its period than the Army of 1933. Despite all the former's defects, as so pungently portrayed by Lord Wolseley and others, it had at least possessed a power of overcoming opposition which the modern army has lost since the rise of the defensive machine gun.

In the Estimates for 1933, the obsoletely armed infantry had to be content with a mere promise that a decision as to the new type of light machine gun might be possible during the year, with a view to provision 'in due course'. The phrase had a fine irony. The infantry had waited more than seven years for a weapon to replace the out-of-date Lewis gun. (One may here interpolate that when 1935 came they were still waiting for the decision, let alone the provision.)

Yet the annual cost of an infantry battalion, obsoletely equipped in weapons and transport, is approximately equal to that of a tank battalion—whose fire-power

is greater than that of four infantry battalions. And although horsed cavalry has long lost any real offensive value as such in European warfare, over a million pounds is being spent each year in maintaining the regiments at home and in Egypt—a sum which would just about suffice to maintain three extra tank brigades. If monetary and military values be weighed, the conversion of the cavalry—which implies its resurrection—is surely overdue.

But the Army budget during all these post-war years has betrayed no recognition that mobile fire-power, not immobile man-power, is the gauge of strength and the index of value for money. In view of the fact that mere numbers count for little in modern war, it was astonishing to note how little the Estimates of 1933 devoted to weapons and machines—only £346,000 for guns and small arms, and £506,000 for tanks and motor transport of all kinds —compared with £20,866,000 absorbed in the cost of personnel. Even a year later, the outlay on mechanized vehicles only rose to £694,000. These driblets appeared all the smaller by contrast with the American decision, in the interval, to mechanize in bulk—and with a grant of $10,000,000 to provide nearly eight thousand vehicles as a first instalment. At the present rate of progress, one felt, the modernization of the British Army on a present-day pattern could hardly be completed before it was somewhat out of date—say, by A.D. 2000.

1934

Happily, signs of a change for the better appeared in 1934. As a consequence, the depression which prevailed among keen and thoughtful soldiers is lifting. It is true that they have had their hopes raised before, only to be dashed, but this time there is more substance to build them upon. In the sphere of promotion, which is bound to be their most personal concern so long as soldiering is a profession, the work of the Stanhope Committee has

already brought a measure of relief. One step was the abolition of the 'Ghost System'—under which general officers who retired did not create a vacancy until they reached the age limit or until three years had elapsed since their last employment. Colonels whose prospect of useful service in a higher grade was growing dim have seen the time of their promotion quickened by two years. And of those promoted a large part will in future be retired after holding one appointment, thus hastening the upward flow. The still more mind-deadening plight of middle-aged junior officers with sixteen or seventeen years' service as subalterns has begun to be remedied, while fresh vents have been made in the middle block, through which promising officers can rise more quickly.

The most important need that remains to be faced is a reduction in the age of general officers, which is dangerously high in view of the quickened tempo of modern operations and their increased strain on mental as well as on physical resilience. Yet the average to-day is several years older than in 1914, when a number of those in key positions broke down in the first weeks. With this qualification, there is encouragement in the fact that something has been done where nothing had been attempted before.

The training season, also, brought evidence of an increasingly realistic tendency and of a growing revival of the art of war. It produced two particularly skilful examples of generalship. One was in a 3rd Division exercise in Wiltshire, where Major-General G. M. Lindsay managed to exploit the mixed elements of mobility available in his semi-mechanized 7th Infantry Brigade and the 2nd Cavalry Brigade in such a way that he not only baffled the advance of superior numbers, but, by a night circuit, seized the nodal points on their own line of retreat. More notable still was an 'amphibious' exercise of the 2nd Division at Aldershot: especially in the contrast it offered to the 'Gallipoli' landing of 1932 in

the same area, which I touched upon earlier. The scheme had certain parallels although it more clearly afforded a choice of alternative objectives. But the great difference lay in the consummate calculation with which the Commander of the landing force, Brigadier H. M. Wilson, took advantage of the opportunity. The outstanding lesson of the exercise, no less than his success, was assured before the first move was actually made.

Much military criticism is no better than 'wisdom after the event'—although not in the usual sense of this facile retort so popular with the friends of any commander whose conduct is called in question. Soldiers, who ought to know better, are as addicted as laymen to the habit of judging by results, and of concentrating their attention on the way a plan works out. Even at the best, criticism of performance is difficult—the properties of the general's instrument and the conditions in which it operates are so variable. Moreover, accident plays such an immense part in any result. The truest basis of criticism lies in the general's appreciation and plan—in his conception rather than in its execution. For if we know the orbit of his thought we have a reasonable guide as to how far he was fitted, mentally, for his task. Here we have a real standard for military criticism, a standard created by many centuries of recorded experience.

Thus, the true ground of scientific criticism with so many operations in the last war is not that they failed, but that they did not deserve to succeed—as a study of their conception will show. Similarly, yet contrariwise, many a commander of earlier times has gained great repute by a victory which, in analysis, is seen to have been no better than an uncalculated fluke.

In contrast, the more clearly one examined this operation of the 6th Infantry Brigade, the more clearly could its success be traced to the commander's 'appreciation' and plan. The detailed instructions for the landing and subsequent advance were so clear and yet so adaptable

that they did much to ensure smooth running. But it was, above all, the bold outline of the plan and its flexibility that opened the way to success. Rare, indeed, is so clear a recognition of the importance of distraction to prevent the enemy's concentration and eventually aid one's own. The commander's decision to make his landing in the dark was a well-calculated risk minimized by the night training of his troops, while the present rarity of night attacks increased its unexpectedness. The additional risk of landing several hours before dawn was justified by the check it promised, and imposed, on the enemy's counter-movements.

The main landing itself was all the more effective through having alternative objectives—Port Guildford and Port Farnham. And it was fitted so well to the topography as to make it most difficult for the defender to block, and most easy for the invader to gain, one of these. Time, too, was saved by making the strategic 'swerve' on a prearranged codeword. A crafty bid was made to open a neglected back door by scaling a difficult cliff path—like Wolfe at Quebec—and this subsidiary landing was nicely gauged both in scale and in prospective leverage; its frustration only served to prove the flexibility of the plan. Here, as elsewhere, the lessons of Gallipoli were turned to account. Thirdly, the landing of a strong detachment on the other coast, near the enemy's headquarters, promised and proved an invaluable distraction, both mental and material, to the enemy. And it was enhanced by the unusual subtlety of making it an hour later than the main landing, instead of earlier. Thus, to the enemy commander it had an air of authenticity instead of distraction, and fixed his reserves during the crucial spell in which the main invaders overwhelmed his advanced fraction and pressed on to seize the unguarded Port Guildford. It was an almost perfect example of military art in exploiting variability, and attaining true concentration through calculated distraction.

In the sphere of Army organization, the year saw several steps towards modernization. The tank battalions were not merely reunited for training, but made into a permanent formation, and added, as the 1st Tank Brigade, to the Army List. It is true that it was constituted from existing units, and that it is still equipped with eleven-year-old medium tanks, which would be scarcely better than death-traps on active service. But a light-tank battalion with a certain number of modern machines is a new addition. And the formation of the brigade is at least a recognition of the need for a strategic arm, to fulfil the rôle of mobile manœuvre against the enemy's rear, which the cavalry contributed until they were hamstrung by modern firearms, and warfare, in consequence, became paralytic.

The past year has also seen a serious attempt to resurrect the infantry as an arm of war—not merely an arm of the law in the less civilized parts of the Empire. If there is a long way to go before it can be assured of a real chance of advancing in face of modern fire-defences, the year's beginning has already done something to revive the drooping spirit of the infantry. Any trifle of new equipment becomes a tonic far more potent than its practical addition—we must guard against the buoyant tendency to overvalue this.

The chief development has been the design of a new-pattern infantry brigade, in which the heavier weapons are concentrated in a special support battalion, while the other battalions are made more manageable by taking away the weapons that are predominantly defensive —the heavy machine guns and anti-tank guns—and adding mechanized transport throughout. The trial of this new pattern is being carried out by the 6th Infantry Brigade at Aldershot—which is thus to be re-mechanized!

The detailed design of the new brigade is open to discussion at several points, and some thoughtful officers even question the principle. They argue that a competent

battalion commander should be able to handle a unit that includes all the necessary weapons, and that in practice he will still have to do so, as the machine guns and anti-tank guns will often be attached to him from the support battalion. But, while this is likely, he will be spared the task of administering and training these extra sub-units. And the new organization promises more flexibility in adapting structure to circumstances. Personally, I welcome it above all as a token of reform and as the most hopeful way of beginning to transform the infantry to a new footing, and acclimatizing them to a new method of fighting. No resurrection is possible until we have rid our minds of the picture of the old-style infantry attack. This, nowadays, is merely a murderous futility.

Leaving aside the possibility, and legality, of new chemical agents, there are only two ways of attack that seem to offer any chance of success in land warfare—by *obscurity* or by *protected mobility*.

The large-scale daylight attack by infantry is as dead as the men who tried to repeat this traditional process in 1914–18. The massed artillery barrage of 1918 scale, with the infantry merely trailing behind it, is utterly beyond the resources of any present-day army. Even if the guns and shells could be produced in peace time in such quantity, they would aggravate the immobility from which all armies are suffering. Worse still, they would offer a massed target to air attack, and court complete paralysis. The remedy would be more dangerous than the disease.

In the dark, in a fog, in a sufficiently widespread smoke cloud, or in woods—all these being forms of obscurity where the deadly machine gun is hampered—infantry may still be able to advance. The past year has seen a welcome emphasis on night and woodland operations. But training will be not fully realistic until infantry attacks except in obscurity are vetoed.

The other way of advance in face of resistance is by

protected mobility—which implies the combination of machine-given speed with machine-borne armour. This way will still be hopeful, even if the high-velocity bullet diminishes the protective power of armour, for speed will remain—and speed is no small aid in avoiding bullets and shells. We are moving, slow as the evolution may seem, towards the idea of the 'mounted infantryman-in-armour'.

One expedient after another has been tried to obviate or postpone this conclusion, yet the bankruptcy of each line of experiment only serves to point it more clearly. The machine gun can only acquire a power to aid the infantry advance equal to its stopping power if it fires from an armoured vehicle. Military opinion is swinging, despite the passive resistance of conservatism, towards the adoption of the armoured fighting vehicle by the infantry —not merely as an occasional outside aid, but as part of the battalion or brigade. Only thus can we save time in the approach. Only thus can we exploit a successful attack before the enemy has time to rally.

One Tank Brigade for the Army will not suffice. Nor would double that strength. For even though these tank units proved the most effective fraction of the Army, they would not long remain effective—if they were only a fraction. Their very menace will make for their early destruction. The enemy will naturally concentrate every effort on removing these dangerous pieces from the board, and disregard the pawns meantime. He will rightly judge that his opponent's infantry may safely be left waiting. Generals may still be found who extol the superiority of infantry over tanks, but when it comes to the test they soon reveal their subconscious conviction—by bending all their efforts towards checking and, if possible, crippling the latter agent. Nothing proclaims more clearly the one they fear most.

The development of air-power increases the risk of a mechanized fraction. The best safeguard is to offer no

particular target: this implies a 'Mechanized Army', instead of merely a number of mechanized units in the Army. But air-power also exposes the futility of any idea of reverting to an old-style army. Even if such an army could find a miraculous means of overcoming machine guns in the open, it would still be impotent under the shadow of aircraft. For although the individual infantryman may be in less danger from the air than a tank or a bus, he cannot move and fight without trailing a mass of transport behind him—to feed his stomach and his weapons. A man without wagons is as useless as a man without weapons. And the present horse-drawn transport of the infantry is less mobile and more vulnerable to air attack than a mechanized vehicle.

While these reflections suggest that there is no secure halting place short of a completely mechanized army—and even that offers only a limited security and effect in these days of air-power—the practical certainty that transformation will be gradual compels us to inquire if anything can be done to minimize the air danger. There is one guiding principle—to avoid offering a target. How can it be fulfilled? The earlier exercises of the Tank Brigade gave a clue to what might be done, while the final 'Mobile Force' exercise showed what must be avoided. (See Chapter XIII.)

A tank force may sometimes need men on foot to force river crossings for it, and also, when halted, to enable the crews to rest undisturbed by snipers and harassing parties. But to attach a whole embussed infantry brigade to it seems a mistake; it cramps its freedom of manœuvre, and doubles the target. To carry a small number of 'tank marines', as one suggested years ago, still seems the better solution.

Transport must be cut down. This should be possible with a tank force. On a short-time raid, officers' mess lorries, cooks' lorries, supply lorries, and buses for spare men might surely be treated as superfluities. Petrol and

ammunition are the only necessities, apart from 'iron rations' that could be carried in the tank. A mobile force must be stripped for action, if it is to be mobile in more than name. This should be the easier now that air transport offers a means of emergency supply.

But to avoid offering a target the most important means is to distribute the target. Concentration becomes the 'deadly' sin—to be avoided at all times save, in some degree, at the moment of striking. A tank force is blessed in its ability to open and close with hitherto unknown rapidity. Wide distribution must be the order of the day. And perhaps of the night also. In the Tank Brigade exercises the most impressive feature was the progress achieved in moving in a state of controlled dispersion (under radio control) distributed over a width and depth of ten miles. But to lie up by night or day, the brigade harboured together. And thereby became, if discovered, an air target—as it never was on the move. Could not this concentration in 'harbour' be avoided? It was good to see how adept the Tank Brigade became in long night moves. But these meant lying up by day—when there is more risk of discovery and attack from the air. Because of its speed and variability of direction a tank force suffers less risk than an infantry force in movement by day—and more risk than the latter when lying up. Thus it seems justified in reversing what is becoming the normal practice.

For a mobile force, secrecy and security would seem to lie more in mystification—through wide dispersion and deliberate distraction—than in pure concealment. Speed gives it a power of mystification such as no ordinary force possesses.

An opponent who is confused by reports of tanks being seen here, there and everywhere, will have more difficulty in blocking the way or striking back than if he has no reports. For in this case he will have reason to suspect that they are stationary in hiding, and can search for

them at ease; if they have invaded his local territory, he may count upon the local inhabitants to inform him of their whereabouts.

Since these reflections were written, further measures of reorganization have been authoritatively propounded. And a start in their fulfilment is to be made in 1935. They include proposals for the formation of a Mobile Division, completely mechanized, in place of the old Cavalry Division. The tentative pattern comprises (i) a reconnaissance echelon, of two armoured-car regiments; (ii) a fighting echelon consisting of a mechanized cavalry brigade and a tank brigade; (iii) a support echelon of two mechanized horse-artillery brigades and a field squadron of engineers, with possibly a field brigade of artillery and a machine-gun regiment; (iv) an administrative echelon (supplies, ammunition, workshops, medical, etc.). The mechanized cavalry brigade would include one armoured regiment (perhaps in light tanks) and three unarmoured but equally mobile regiments similar to the French *dragons portés*—mounted in small and low-built vehicles, with low-pressure tyres, and so designed that the men can dismount instantly.

Such a Mobile Division, if far more effective than a horsed Cavalry Division, has still the difficulties to overcome which partial trials in this country have revealed. Both the French and Italian Armies have preceded us in creating Mobile Divisions, and neither seems to have found them altogether satisfactory. The danger is that the unarmoured portions may cramp the armoured more than they assist them. Still, the idea has clear potentialities, so long as the division is used as a mobile protective base from which the Tank Brigade can be shot out independently—like a bullet from the cartridge. But one would rather see a true armoured division, carrying a proportion of skirmishers and engineers in bullet-proof

vehicles. Even in the first stage of the transition, the mechanized cavalry brigade might preferably be composed of light-tank regiments.

The reorganization of the division is also to be undertaken. A promise is held out of the early mechanization of the division except for its artillery—here cost is considered the check, but the exception may prove a nuisance, and commercial lorries might be better than horse-teams until proper tractors can be provided. But the mechanization of the infantry transport will be no small gain, diminishing the problems of ammunition supply, portage of weapons, and load on the fighting man. And a battalion can then be moved in buses without leaving its transport to follow slowly. This will also reduce congestion on the roads, since the road space will be occupied for only a fraction of the present time.

The disproportion between the infantry mass and its supporting arms has now been recognized. The artillery support of the division is to be increased by converting the light brigades into mechanized Army field brigades, of which there will now be available two per division instead of one. Although not actually incorporated in the division, they form a fluid reserve which can be utilized to provide more than two extra brigades in support of any division that has to crack a hard nut. Close support of the infantry, formerly the rôle of the light artillery, will be left to the infantry mortars, now to be mechanized.

More important still is the intention to create additional tank battalions, on the scale of one to a division, which are to be equipped with special infantry tanks, low in speed as well as in build, but heavily armoured. These likewise can be concentrated on the decisive sector. Such an addition does not supersede the need for a proportion of 'armoured infantry'—but a hope of the latter development is held out by the intended revival of experiments with the armoured machine-gun carrier, in which the gun

is mounted on the vehicles and fires from it, although normally when halted.

There are possibilities also in the idea embodied in a tiny box-like machine, invented by Colonel Martel, who produced the first light tank. Its build is aptly indicated in its nickname of 'mechanical coffin'; for it is only 7 feet long, 2½ feet wide (in the present one-man type), and stands only 20 inches above the ground—barely knee high. Propelled by a 4 h.p. motor, it will hold a light machine gunner lying flat, and will carry him much faster (about 5–6 m.p.h.) than if he tried to crawl, and with far less exposure than in the normal advance where he has to run or walk upright. While travelling along the road, the occupant sits comfortably in his 'perambulator', but on reaching the battlefield changes to a prone position with his weapon pointing ahead. Using an 'armoured crawler' of this kind he may have a far better chance than a man on foot of getting within close range of the hostile machine gunner ensconced behind cover.

The idea gains strength from the prospective reorganization of the infantry unit designed to produce a smaller and handier battalion, in which a better balance between man-power and fire-power is attained by reduction of the former and increase of the latter. It is built up on the platoon of three sections with a light machine gun in each, instead of four sections with a Lewis gun in two of them. With the transfer of the heavy machine guns to a mechanized support battalion, now to been titled a 'machine-gun battalion', the ordinary battalions will once again have four rifle companies—but with twelve light machine guns apiece. No less important is the idea underlying this distribution—that the light machine gun will be a detachable arm of the section, accompanying it when extra fire-support is needed and being dropped when circumstances require extra mobility. One effect of the acceptance of this principle is, surely, to pave the way for the adoption of some cheap and handy mechanical means

of moving and using the light machine gun belonging to the section. The armoured crawler or something similar seems to fit both the tactical need and the operative design.

Fundamentally, the most promising aspect of the scheme of army reorganization is that *adaptability* is its keynote. Thus, the Mobile Division may operate with or without a tank brigade. The increased number of Army field brigades, adopted instead of an increase in the strictly divisional artillery, will allow greater concentration of fire on the crucial sector of an attack, and more possibilities of varying the point of main effort. The machine guns of the infantry brigade may be used either for distant or close fire-support, or for an armoured punch, according to circumstances. In defence, likewise, the fire-support will be more fluid. Finally, even the basic unit, the infantry rifle section, gains in adaptability through the detachability of the light machine gun with which it is now to be endowed.

The chief question that remains is how much time will elapse before the achievement of a transformation that is already behind time. A military philosopher may recognize the inevitability of gradual evolution, but a military historian must point out how often it has proved fatal to nations. The money spent on armies that failed to adapt themselves to changing conditions has proved too literally a sinking fund—acting as a millstone round the investor's neck when he was plunged into the deep waters of war. We may still wonder whether the modernization of the army will keep pace, or rather catch up, with the changing conditions of *time*. But it is a hopeful sign that its pattern is based on the idea of adjustment to changing conditions of *circumstance*.

CHAPTER XIII

THE EVOLUTION OF ARMOURED MOBILITY 1932–35

In 1932, for the second year in succession, but with an addition, a tank brigade was once more formed for training on Salisbury Plain, and totalled some 230 tanks. This steel-clad array certainly looked impressive. But analysis reduced its significance. For some eighty of the machines were the little Carden-Loyd machine-gun carriers, which have long striven to fulfil a fast light-tank rôle beyond their powers. As for the hundred medium tanks, they are too old in years and too thin in armour plate for employment against a properly equipped modern army, although they might be formidable against tribesmen—so far as such aged machines could stand the mechanical strain. The balance, of fifty machines, was composed of the new two-man light tanks. Fifty may sound a lot until we remember that the annual cost of such a machine should, in mass production, approximate to that of a couple of infantrymen, and that, in comparison, we maintain over a hundred thousand of these unprotected 'foot-sloggers'. For practical purposes, the proportion is disproportionate, especially in view of the way in which the machine gun dominates the modern battlefield. We can scarcely hope to rescue battle from its recent indecisiveness unless we show an historical sense of proportion in our military organization.

It is worth recalling that in the wars of modern history where the mobile arm served as the arm of decision, its proportion to the infantry was as one to two, or even

higher. This is the kind of pivotal fact that the normal labourer in the field of military history rarely notices, still less emphasizes.

Gustavus, 'the founder of modern warfare', made his mark on history more by the instrument he created than by his skill as strategist or tactician. He stands out among the Great Captains as a scientific army organizer, and the most impressive feature of his army was the balance between the different arms, the powers of each being revised and developed. Thus, we are justified in regarding their proportions as more than a matter of convention, and in taking note when we find that at Breitenfeld the Swedish army appears to have had over 7,000 cavalry out of a total force of about 22,000. Military thought then and thereafter gave special attention to this question of proportion, and Monck (the future parent of the British standing Army after the Restoration), writing about 1646, enunciated the principle that 'where your service lieth in campagnia, the proportion of your Army ought to be as two Footmen to one Horseman, besides your Dragooners. But where the service of your Army shall be most in sieges, there you ought to have three Footmen to one Horseman . . . and to every eight hundred Horse you ought to have an hundred and fifty Dragooners'.

When the New Model was organized, the mounted troops were increased until they reached this ideal proportion. It comprised 7,600 horse to 14,400 foot. Even when Cromwell invaded Scotland in 1651, despite the hilly country his army of 16,000 men included 5,400 horsef

More remarkable still, as time passed and the power of infantry was developed, the proportion of the mounted arm tended to increase. When Louvois a generation later created the French royal army, which became the pattern for the military world, he provided no less than 65,000 horse; and by 1690 they had risen to 90,000. It is true that the total of the army was about 400,000, but a large part of those were merely garrison troops. In the cam-

paigns which made the France of Louis XIV the most formidable power in Europe, the field armies often comprised more cavalry than infantry. Thus, in 1692, Marshal Luxembourg had over 30,000 mounted men out of a total of 60,000 in his army. As the wars continued, the financial strain compelled serious reductions in the French Army, and the more expensive arm naturally suffered worse. The lessened quantity as well as the inferior quality of the French cavalry in the next decade would seem to have played a part in the French defeats that has not been fully recognized.

By contrast, Marlborough owed much to the steps he took to develop the manœuvrability of his cavalry and to revive the speed of the charge. It is significant that when Louis XIV ordered Marshal Tallard to set out with 50 squadrons and 40 battalions on the fateful march to meet Marlborough on the Danube, Tallard protested that 50 more squadrons were essential—'I venture to say that with fifty squadrons of cavalry, which I am to have, a campaign cannot be undertaken.' Nevertheless, he had to go —to meet his fate. At Blenheim, Marlborough and Eugene had some 166 squadrons and 66 battalions—probably numbering nearly 20,000 cavalry to 30,000 infantry. Their opponents were stronger in infantry but weaker in cavalry —and the difference of proportion added to the indifferent quality of the French cavalry was perhaps the most important factor in the issue. By the time Ramillies was fought, the cavalry strength had been increased, Marlborough having some 29,000 cavalry to 35,000 infantry.

But even now the greatest battle triumphs of cavalry still lay half a century ahead—and were due to the uprising of inspired leaders who found in a fresh access of speed the means to offset the improvement of infantry fire. In modern times, the historical significance of Frederick the Great's development of fire-power has had an unhistorical effect—remembrance of the rolling volleys of his highly drilled infantry has partially eclipsed the deci-

sive rôle of his cavalry under Zieten and Seydlitz. His infantry was ready-made when he came to the throne; in his first battle at Mollwitz, their rapid fire saved the day that seemed lost through the cavalry collapse. The effect on Frederick was to make him set out to develop his cavalry in numbers and quality. At Mollwitz, its proportion to the infantry was only as one to four, and the enemy's was double the number; in his victory at Hohenfriedberg four years later his ratio was three to five, and his cavalry were double the enemy's. They were brought to the pitch, regardless of casualties in training, of charging at the gallop—never before in modern history had such speed been attained. They won at least fifteen of his battles. At Rossbach, indeed, Seydlitz's successive charges with 4,000 of the cavalry shattered the French Army of over 40,000 men—through catching it on the move—without the intervention of the Prussian infantry, save a few battalions. And at Zorndorf, again, this thunderbolt of war first saved, and then won, the day with his cavalry charges. It was a prompt double fulfilment of the promise implicit in his curt comment when promoted major-general—'High time, Excellency, if they wanted more work out of me. I am already thirty-six.'

Here was the zenith of the mobile arm. Under leaders less instinct with mobility, it could not cope with the growth of fire, and its power became paralysed even before its proportions shrank.

But with the modern resurrection, through petrol and armour, of a mobile arm in the true sense, the question of proportion becomes again of importance. It is surely to the experience of Gustavus and Cromwell, Condé and Luxembourg, Marlborough and Frederick, that we should turn for guidance. Cost will be urged as a barrier. The answer is that the maintenance of a cavalryman and his mount in the seventeenth century cost more in proportion to that of the infantryman than does that of a modern tankman and the proportionate fraction of his mount.

We are not justified in expecting a decisive effect from the rebirth of a mobile arm unless it is re-created according to the proportions born of experience—at least the proportion of units if not that of men. This would imply a scale of one tank battalion to two infantry battalions. The gap that would have to be spanned is great—at present the ratio is only as one to twenty-three in the British Army, or as one to twelve in the Expeditionary Force. The promised equipment of infantry with armour-piercing weapons is, historically and logically, a reason for hastening rather than postponing an adjustment of the scale of the modern-style mounted arm to that which experience has shown to be fitting—for decisive action. Unless army organization regains this balance, it seems vain for soldiers to dream of mobile warfare, and more reasonable to accept the probability that military operations will be as static in the future as in the recent past.

The light of these comparisons prevents an exaggerated stress on the appearance of fifty proper light tanks. Nevertheless, it constituted the distinctive feature of the 1932 exercises, directed by Brigadier Laird. And they sufficed to form a complete light-tank battalion; the three mixed tank battalions of the brigade had to carry on with machine-gun carriers in their light-tank sections, except for a short period when the light-tank battalion was split up among them.

A questionable feature of the year, the first when these light tanks were available, was the tendency of higher authority to revert to the conception of close co-operation between such fast tanks and infantry. The results, as was not surprising, did not repay the attempt. And the picture was not convincing. For it is patently unreal when a battalion of modern high-speed tanks goes 'at heel' behind a battalion of foot soldiers, and is used to help that battalion forward. The infantry should either be equipped with means to overcome opposition from hostile infantry

rearguards, or they have no place and purpose as an advanced guard. Incapacity for this task is a reflection on the existing equipment of the infantry rather than a justification for using tanks to put them on to their objectives.

The sight of such a tank battalion being used to aid an infantry battalion, or even a brigade, in taking its small steps, has the quaint grotesqueness of that favourite nursery picture in which a tiny tot has her arms round a towering St. Bernard, holding it tight with a commanding air that deceives no one as to where power really resides.

It is unreal also when a battalion of high-speed tanks is used to strike at such a small and dispersed target as an enemy infantry battalion offers when deployed. It is the more unreal if we substitute war for peace conditions, and picture the back areas of a force—even a small force on active service—clustered with battery positions, headquarters, supply columns, dumps and resting reserves. Is it reasonable to expect that in the fog of war and heat of action a 'gate-crashing' body of tanks should pause to present their cards to the doorkeepers when they see such an inviting feast of targets beyond? How unwise, too, to expose themselves to uncomfortable attentions by such precise dallying. The farther they get into the enemy's position, and the quicker they get into the midst of it, the safer they will be. Danger comes in breaking through the crust, and will arise again if they allow time for a fresh crust to be formed. The more one meditated on the attempt to revive close co-operation between the new mounted arm and the infantry, the less one liked it.

On their own, in contrast, the swift and free way in which the tanks manœuvred gave a vivid emphasis to their natural function as the heirs of cavalry—a mechanized cavalry. And the comparison was a warning reminder of the historical error of mixing cavalry with infantry. How often did the Great Captains condemn and correct this stultifying hybrid, sired by confused thought and damned by over-caution. Yet how often was this error

repeated! Military evolution seems condemned to travel in circles—to chase its own tail. The best hope of release lies with those who have personal experience of the possibilities of modern tank mobility.

The year's exercises certainly brought out the growing speed of manœuvre due to higher-speed machines. In one exercise, for example, a battalion completed five movements, during which four miles were covered in a direct line, and much more actually, in thirty-five minutes. It is significant that a previous battalion, still using the old Carden-Loyds as its scouts or 'feelers', had taken fifty minutes for the same series of movements. It may thus be reckoned that the advent of the new light tanks has brought roughly a 50 per cent increase in the speed of manœuvre of an armoured formation. How a Seydlitz or a Murat would have gloried in handling such supermobile troops! How a Frederick or a Napoleon would have profited by the possession of such a mobile arm! Will their twentieth-century successors perceive the opportunity? For in such a force lies the means, the only means, of exploiting a penetration quickly enough and deeply enough for decisive effect.

Another exercise brought out the significant fact that once light tanks penetrate a hostile position their infiltration is so rapid that the defender has a poor chance of withdrawing his infantry on either flank of the breach in time to rally and build up a fresh line of resistance to the rear. This effect, likewise, is not surprising to anyone who has reflected on the nature of modern warfare. For, because of their endowments of speed and armour, tanks are clearly the ideal agents of infiltration or 'soft-spot' tactics, i.e. to push on along the line of least resistance while reserves deal with the cut-off 'islets' of the defence that still hold out. In 1918, these tactics brought the Germans great success—limited, however, by the fact that the infiltration was carried out by slow-moving and non-bullet-proof infantry. To-day it can be carried out by tanks,

less susceptible to the risk of being checked by flanking machine guns.

The celerity of tank force was shown in a different form in an exercise where the 2nd Bn. R.T.C. was suddenly called upon to intercept the march of a reinforcing infantry brigade, so as to prevent it tilting the scales of a battle. When this urgent call came the tanks were lying up under cover five miles distant from the head of the enemy column. The latter had a less distance to go before it could arrive on the battlefield. But it did not arrive. By 9.55 a.m. the tank battalion was on the move, already preceded by a patrol of light tanks reconnoitring for the head of the enemy column. By about 10.15 a.m. this head was riven by the fire of the leading tank companies, which swept up the column in a scoop-like formation, keeping inside the enemy's anti-tank weapons so that their fire was masked by the latter's own massed infantry. By 10.30 the column had been completely dealt with, when an air report was received that enemy tanks were hastening to the rescue. It produced an instant answer. Within ten minutes the whole tank battalion had rallied, reformed in trident, and was ready to tackle this new opponent. Such quickness in reorganizing offers a remarkable contrast to the older arms. It is a product of the new tank team work, no less than of tank-mobility.

But perhaps the acceleration of battle moves was most of all strikingly illustrated in some of the tank *v.* tank exercises. To follow such a battle one really needs a cross-country vehicle faster than the tanks themselves; but even then one would often be baffled because of the ground-craft developed by some of the tank leaders. Their acquired skill in using shallow depressions and folds in the ground provided a disconcerting reminder that the Plain has not a plane surface, and that even in the most open country Nature affords land-ships a scope for surprise which is lacking at sea.

Here is one dominating impression of tank warfare.

Another is the rapidity of action, far exceeding that of naval action relatively to the size of units, and presenting an utter contrast to the land battles of the old style. In one of these latest model land battles, the main 'fleets' were over five miles apart when their approach was signalled from the air. Twenty minutes later they were pouring broadsides into each other at close range. In another twenty minutes the battle was over!

Commanders accustomed to handling ordinary formations of infantry, cavalry and artillery would be likely to go badly astray under such supercharged conditions. The fact has significance, and explains much of the chaotic appearance of our training and doctrine at present. We obviously cannot hope to use modern formations effectively until both the higher commanders and the doctrinarians have developed what one may call a 'tank-time sense'. It is certainly growing among the actual tank leaders, but that is not enough.

A tank *v.* tank battle on such a large scale as this undoubtedly provides valuable experience. But it must be viewed in true perspective as an eventuality rather than a probability, still less a desirability. For any commander, possessed of such a potent 'piece' as a tank force, to throw it away in fighting the enemy's tank force would be foolish in most circumstances. And the more foolish if an army, like ours at present, possesses only a single tank brigade. It would be as foolish as for a chess-player to begin the game by 'swopping' queens. To do so might be justifiable for the weaker side, purposing a prolonged defensive, trusting in a static defence, and having the natural obstacles for such passive resistance. But outside this rare case any army would be wise to preserve its tank force for purposes more profitable than merely cancelling its opponent's assets—by common suicide. The fewer tanks we have the more reason for using them with true economy of force. So we can regard an 'open' tank battle as the exceptional case.

It is against the communications and administrative areas of an opposing army that tank power can best be directed. The difficulty of countering it was vividly suggested in an exercise where the 2nd Battalion (under Colonel Hobart) with a light company attached was sent to swing round the eastern flank of a 'Northland' army and attack its headquarters at Tilshead. In this test the dice were loaded against the assailant. His lines of approach were restricted by blocked crossings and an imaginary lake, so that instead of a 360-degrees choice he was reduced to a mere 90-degrees range, converging on Tilshead from the north-east. And at the end of this cone the enemy headquarters were protected not only by a tank battalion but by a special company of twenty-four anti-tank weapons created for the occasion—such an organization only exists on paper.

The one advantage of the attacker was a difference in speed, due to the fact that the new light tanks were allotted to the attacking battalion. The difference it created in the exercise revealed the change that pure speed can make in offensive power, and the way that tank mobility changes the normal conditions and calculations of war. A mere 90-degrees range of manœuvre at such speed sufficed to pierce the web of the anti-tank defence. The use, and sacrifice, of one company as a distraction absorbed the enemy's attention for a matter of minutes only, but during this brief distraction the rest of the attacking battalion slipped into Tilshead from another angle.

In the later exercises the Tank Brigade as a whole was used as an army's strategic arm of manœuvre. In one it circled round the flank of a hostile army with the aim of turning that army's retreat into a rout. At daylight the brigade was concealed eleven miles distant from the road on which the nearest columns were retreating. The distance would have been nearly a day's march for an ordinary force. After a rest and the issue of orders, the

light battalion moved off at 10.30 a.m. followed by the three mixed battalions. Within twenty-five minutes the light battalion had advanced over seven miles. Here came an inevitable check in passing through the bottle-neck from one training area to another. Yet before 11.30 it had made contact with the enemy's marching column. And from 11.35 a.m. to 11.50 a.m. a stream of messages reached the distant brigade tank in rear, giving the location not only of the head and tail of that column, but of its battery positions and anti-tank weapons. The light battalion then rallied, ready for further tasks. The accuracy of this reconnaissance was as remarkable as its quickness, for some 90 per cent of the locations given were correct.

At noon, Brigadier Laird was thus able to give orders for the 5th and 3rd Battalions R.T.C. to cut up the forepart and hindpart respectively of the enemy column, having sent off one light company ten minutes earlier to block the head. At 12.40 began what recalled Polybius' description of the Roman pursuit after Ilipa—'a slaughter as of sheep'. At 1.5 p.m. the 2nd Battalion, followed by the remaining two light companies, was launched through the gap between the first two battalions to extend the enemy's disorganization.

It is worth emphasis that this Tank Brigade, although not complete with the latest machines, embodied a fire-power—in guns and machine guns—greater than that of a whole infantry division of nearly 20,000 men. And that fire-power is for practical effect multiplied by armour and speed in the case of the Tank Brigade. Yet it could be assembled, as we saw, in a space that was not a tithe of what an infantry division would occupy. More significantly still, that tremendous potential concentration of fire-power was wielded by hardly more than 600 men!

If battles are won, as the pundits are always repeating, by the concentration of superior force at the decisive spot, it may be well to ponder the fact that no other type of formation can so concentrate its force at a spot as can a

tank formation. And, in modern combat, force is a matter of fire-power. Further, the conditions of war are still such that fire which is directly applied at close range—as the fire of an armoured force can be—is far more potent than indirect fire, in battlefield reality.

For the succeeding exercise the Tank Brigade disappeared from Salisbury Plain into the depths of Dorset. The light battalion took only two and a half hours running time for a thirty-four-mile move to bivouac near Blandford. Next morning the brigade, directed in a long-range manœuvre wide round the flank of a hostile army, covered nearly fifty miles. By the afternoon it was astride the enemy's rear, and was still 'going strong'. The broad significance of such a tank manœuvre is best perceived by reference to some actual case—from historical experience. The scheme suggested one. For the 'general idea' was that, war having broken out in mid August, the small Southland Army of two corps had been compelled to retreat. The invading Northland Army had then pressed on menacingly towards Southampton, Southland's capital, and had reached the rough line Winchester–Salisbury, when Southland's reinforced army passed to the counter-offensive, coincidently with the Tank Brigade's stroke at Northland's communications. The parallel with August and September 1914 was too striking to be missed.

When the British Expeditionary Force stood at bay, first at Mons and then at Le Cateau, the possession of a tank brigade such as we saw here, and its ability to carry out a manœuvre of this radius, would have enabled us to cut the communications of Kluck's attacking army. This could hardly have failed to save our army from the peril it stood in at Mons and Le Cateau, from which it only escaped in 1914 at the price of an exhausting and costly retreat.

Take, again, the Battle of the Marne. This manœuvre by the Tank Brigade would have taken it right round the flank of the Germans and astride the rear of their right

wing. With our knowledge of the 'loosening' effect of a far shorter-range flank move by Maunoury's army in September 1914, it is easy to gauge the collapse of the German right wing under such a stroke.

Take the sequel to the Marne, the so-called 'race to the sea' after the Allied pursuit was blocked along the Aisne. Over a week passed before the Allies were able to develop a turning manœuvre, and the Germans had ample time to block it. Twelve days elapsed before a second attempt could be made, farther north near Arras. It proved similarly futile. The third attempt, by the British II and III Corps, between La Bassée and Messines, took another nine days in delivery, and was abortive. A fourth attempt by the British I Corps at Ypres, a week later, was not merely a failure, but found the Germans ready for a greater counter-offensive.

Yet in each case a single day's march by a tank brigade if available would have carried it right round the flank and on to the rear of the Germans—as they were placed on the day after these old-style turning movements were ordered. Such is the difference between manœuvres in tank time and in old time. Tank time is the correct time for marching to a decisive spot. It gains time so quickly that it can gain a decision. And it is the only rate of manœuvre which has such a promise in modern war.

But there was another significance in this reproduction of history. Conservative critics often refer portentously to the problem of supplying what they term a 'mechanized army'; and imply that it would be so formidable as to make mechanization a hazardous leap in the dark. Now, in actual fact, a tank brigade (or brigades) could complete any of these incomplete 1914 manœuvres and return to its base (with the main army) without any transport at all if necessary. For the medium tanks carry enough petrol to take them well over sixty miles out and back, whilst food for the tank crews can be carried more easily in the tanks than the great cavalry raiders of the past

carried it on their horses. The modern armoured cavalry are, indeed, so much better fitted for moving without the impediment of transport that it might be well if they were accustomed to do so. Even if a manœuvre of double this radius (i.e. 250–300 miles) was required, a mere twenty petrol lorries would suffice to refill the whole brigade. What a contrast to an ordinary division which includes some 740 horse-drawn vehicles, apart from the 360 motor vehicles which are needed to bring up its supplies, baggage and ammunition as it is crawling along at a fifteen-miles-a-day rate!

But it is not often that an out-and-back journey of 250–300 miles would be required to reach and cut the enemy's communications. Let us take once more an actual case. If in 1914 we had possessed a tank force, and had landed it at Antwerp, a move of barely sixty miles would have carried it to the Meuse, and placed it astride the communications of the German armies that were marching through Belgium into France. It might have made the Battle of the Marne superfluous and saved the four years' occupation of Northern France.

1934

Broken up after the training of 1932, its units being used for a season in piecemeal work with the infantry, the Tank Brigade was reconstituted two summers later—and this time as a permanent formation. Moreover, strategic manœuvre against the rear of a hostile army was now recognized as the most important purpose of such a force. The command was assumed, shortly before training began, by Brigadier P. C. S. Hobart.

The '1st Tank Brigade' comprised (i) a brigade headquarters; (ii) the 1st (Light) Battalion, Royal Tank Corps; (iii) three mixed, now renamed 'medium', battalions—the 2nd, 3rd, and 5th; (iv) the Tank Brigade Transport,

organized to make the brigade self-contained for fuel, food and ammunition supply during several days—so that it could cut loose from its own communications when attacking the enemy's.

Each medium battalion was composed of a headquarters and three mixed companies. Each company comprised a medium tank for headquarters, a section of seven light tanks, a section of five medium tanks, and a section of two close-support tanks—making a total of fifteen tanks, and forty-nine in the battalion.

The light battalion also comprised a headquarters and three companies. Various types of company organization were tried—in one company, three sections each of five light tanks; in another, four sections of three; and in the third, four sections of four.

One had only to see the brigade on the move to realize that, as regards equipment, it was very far from being a complete force that could be despatched on active service. Not only were the medium types still of the old pattern, but the close-support tanks were simply the same machines theoretically adapted to the other rôle—by giving the gun-barrels an upward tilt and a touch of white paint. And although a considerable improvement had been made in the petrol-tank capacity of the light tanks, these were still a mixed collection. Only one company was homogeneously composed of modern two-man light tanks, and while there was a sprinkling of the latest three-man machines, there was a far larger proportion of the early Carden-Loyds—the 'tankettes' which became infantry machine-gun carriers.

The Brigade exercises opened in mid August with a practice of the medium battalions in close-order drill—changes of formation from 'trident' to 'line ahead', 'double line ahead', etc. The drill movements were similar to those adopted in 1931, apart from two innovations. One was a change of direction when in 'two-up' formation (two companies leading, with the third behind and between);

if, for example, direction is to be changed to the left, each company wheels left simultaneously, the left forward and rear company becoming the new forward companies, while the right forward company moves up in rear. The other innovation was an instant reversal of direction by countermarch. Both, by obviating a prolonged wheel, save time in manœuvres. All orders were given by radio-telephony instead of by signal.

Scheme No. 2 consisted of practising the brigade as a whole in manœuvring over open country. No. 3 was a cadre exercise in which communication by radio-telephony was practised at wider intervals; also a brigade change of direction when advancing along roads.

Certain minor tactical problems were treated at the beginning of the second week. One was that of forcing a passage over an unfordable stream where the bridge, although obstructed, may be passable. Here the favoured method was, under cover of a smoke screen from the close-support tanks, to get the light tanks across to deal with hostile anti-tank weapons, while the medium tanks moved into position to support the light tanks with their shells. In another test the bridge was thoroughly blocked, so that it was no use to push in the light tanks. Instead they reconnoitred their own side of the stream for alternative crossings, and also sought to draw the enemy's fire, thus enabling the commander to make a fire-plan with the aim of smothering the opposition and getting his medium tanks close enough to clear away the obstacle. A third test was that of normal march movement through a hostile village. Here the principles are that the tanks should avoid bunching, that they should 'close down' as a precaution against missiles dropped from the housetops, and that the leading light tanks should have one or two close-support tanks just behind, ready to aid them instantly with smoke or shells.

Scheme No. 4 began with a southward march on two roads, followed by a change of direction to the east. Then

in the afternoon the brigade crossed the Avon westwards in three columns and attacked the artillery positions behind the front of a hostile force, in conjunction with the direct attack of their own infantry. Although the tanks' line of approach was from a flank, the method was to attack the actual artillery area from the rear. There were four groups of enemy batteries, and the tank brigade attacked the two right groups first with its forward battalions; as soon as it was clear that they were succeeding, the reserve battalion was directed against the third group of batteries; and when the right-hand forward battalion had mopped up the right-most group it was switched across to deal with the remaining group, on the extreme left.

Despite the apparent complexity of this tactical manœuvre, the whole operation was completed within two hours. It illustrated the flexibility, and the capacity for successive combats within a day of battle, that a tank force may possess. One effort at one spot in one day has been the normal limit for the older types of force.

In the fifth scheme, the brigade left the sphere of tactics for the wider sphere of strategy. The general idea was that an Eastland Army had recently invaded England, driving the defenders back to a line from Brighton northward to Oxford. After a pause, the Eastland Army had launched a fresh offensive against the English front, and at the same time the Eastland tank brigade was sent wide round the northern flank to disorganize the English communications and back areas. It had first, in supposition, descended upon Devizes and destroyed this source of supply, afterwards spending the night in 'harbour' at Tilshead, fifty miles behind the enemy's front. At this point the exercise opened.

If the brigade continued on its southerly course, the obvious next objective was the great railway and munition centre at Salisbury. But the enemy were now thoroughly roused, and had taken steps to defend Salisbury, especially

on the north and east. Aware of this, the commander of the Tank Brigade decided to lull their fears by the aid of his long-range mobility. About 10 a.m. the brigade moved due west on a five-mile front, with the three medium-tank battalions on parallel lines of advance. The light-tank battalion had already gone ahead to reconnoitre.

It was, of intention, a well-advertised advance across the open Plain, in the hope that hostile air observers might give full news of it—although too late to save one of their own mobilization camps near Warminster from being swallowed on the way. After their ten-mile run across the Plain the tank battalions dropped down off the heights and 'disappeared' into the thickly wooded country to the westward. Under cover of it they changed their direction to south-west.

The light battalion covered the advance with a widely spread screen that, by just after midday, was carried as far as the line Castle Cary–Wincanton, some thirty-five miles from their starting point. About ten miles behind the leading patrols of the light battalion came the three medium battalions. These moved by separate routes, choosing by-roads which avoided the towns. The breadth of front varied, but was sometimes as much as ten miles, stretching to the limit the range of communication by radio-telephony, and compelling occasional resort to ordinary wireless.

The 2nd Battalion, on the brigade centre line, reached its midday halting place in barely three and a half hours; deducting the fighting interlude on the Plain and an intermediate halt later, its running time was a good hour less. When the march was resumed about 4 p.m., the brigade doubled back eastward. The idea was to turn off the previous direction at points where the turn was not likely to be discovered, to break up into fragments, and use unfamiliar tracks.

To save time on the turn-about the brigade 'somer-

saulted' instead of wheeling round. Thus the 5th Battalion, which was farthest west, turned sharply to the left, and moved due east in three columns. The 2nd Battalion continued a little farther southwards before turning east and breaking up similarly. The 3rd Battalion kept on its south-westerly course for seven or eight miles, advertising it by passing through Mere and Gillingham; then at last it swung round to the north-east through wooded lanes, and, when it finally emerged, it crossed an open stretch going westward again, before disappearing finally into another belt of woodland where its night 'harbour' lay.

Thanks to well-calculated timings, these mystifying movements were made without the numerous columns getting in each other's way. Meantime, B Company of the light battalion had prolonged the bluff by making another long bound to the westward, as far as Glastonbury. The rest of the light battalion, using its speed, had doubled back during the midday halt, in time to precede and screen the eastward move of the medium battalions. When patrols had to pass through a town or large village during this final eastward stage, they sought to maintain the deception by getting on to its north side and passing through it by a southerly road, before turning east afresh.

By 6 p.m. the dispersed fragments of the medium battalions were reassembling at rendezvous on the wooded fringes of the Great Ridge sixteen miles west of Salisbury. And an hour after, they were in a concealed harbour near by—'harbour' is the nautical term that has replaced the old 'laager'. They had covered from fifty to sixty miles, while the bulk of the light battalion went at least half as far again, as far as one could calculate. As for B Company, some of its light tanks had travelled 130 miles before they reached harbour in their late and unobtrusive withdrawal from the Glastonbury area. They had added to their effect, as well as their mileage, by a 'stage-army' performance at certain towns—that of circling back unobserved, and passing through it once or twice more, in

order to create the impression of a continuous westward flow of tanks!

The culmination of these efforts came early the next morning. At dawn a light company broke cover northward and gained the crossings of the Wylye, followed closely by the 3rd Battalion, which then crossed the Avon in turn and closed upon Salisbury from the north. Another light company swept along the ridge eastwards to secure the bridges nearer Salisbury, by crossing at an undefended ford and clearing them by attack from the rear. The rest of the brigade followed across the bridges and pushed down the corridor between the Avon and the Wylye against the vital part of the city, while the light battalion went off to distract the enemy's attention by feints on the south and east sides. In barely two hours from dawn Salisbury was surrounded and all exits blocked. The actual technique of tank attack on a town was left for practice in the next week's chief exercise.

For the purpose of this, Savernake Forest was transformed for the day into a city of half a million inhabitants. As there is some reluctance among the municipal authorities of brick-built towns to allow their streets to become the scene of an attack, an alternative had to be found; and, as the War Office cannot afford to vie with Hollywood in the brief creation of plaster cities, the commander of the Tank Brigade was inspired to make an adaptation of Savernake Forest, which in its area, its intersecting avenues and its natural wood-built blocks, adequately resembles the layout of a modern city.

The general idea of this exercise was a fresh instalment of the last. In supposition, the Tank Brigade, after its actual swoop upon Salisbury, had driven westward against Yeovil, and then north against Shepton Mallet, whence it doubled back eastward to harbour near Tilshead (its training camp). The move to Shepton Mallet induced the enemy to concentrate all his own tank battalions for the defence of Bristol, so giving the Eastland tank brigade

a better chance of striking successfully at Savernake City.

To some critics it may seem that a tank force would not be able to enjoy such a long run of exploits behind the enemy's front without being crippled itself. But the moves it made, and those it was assumed to have made, were not beyond the capacity of a properly equipped tank force. There is ample experience in military history to show that a mobile force, by threatening several of the chief towns in an enemy's territory, may get the chance to strike at some of them unopposed, and also to cut the enemy army's communications without serious interference.

The Tank Brigade moved out of its harbour shortly before noon, and advanced rapidly eastwards in two-up formation, covered by the light-tank battalion. Then, on passing the Avon, it swung suddenly northward. Now, with all three medium battalions 'up', it advanced on a wide front of six miles that widened to eight as the battalions moved to converge upon Savernake City from three sides—east, south and west. The light-tank battalion, now relieved of its protective rôle, raced ahead to close the exits to the north, where no attack was to be made—as the routes of approach could be more easily blocked by the defenders. To reach their positions for the ultimate 'crunch', the medium battalions had to cover twenty to twenty-five miles, of which only the first part was over the open, the rest being through winding lanes. Even so, they were in position just after 3.30 p.m., having halted for about an hour on the way. And at 4 p.m. the three battalions rolled inwards on the encircled city.

At various points, concealed anti-tank guns took toll of the leading tanks before they themselves succumbed to weight of shell. For once these anti-tank guns were not entirely composed of the too familiar green and white flags, which represent them in the great majority of our infantry battalions. Part of those in action here were the heavy

tractor-drawn 8-inch anti-tank guns of the 7th (Experimental) Infantry Brigade. By 4.40 p.m. the 5th Battalion R.T.C., coming in from the east, had gained both its objectives, the transport park and the enemy's G.H.Q. One company succeeded in avoiding any of the anti-tank guns on its indirect approach to this important target. The 2nd Battalion, coming in from the south, dealt with the 'power house' and the 'munition factory', the main wrecking task being done by demolition parties vomited like Jonah from the whale's belly. Meantime, the 3rd Battalion attacked the 'railway station' from the west.

What followed was a still more striking illustration of the operative celerity of a tank force that is controlled by word of command over the ether. At half past five the several tank battalions were engaged in their rôle of destruction in the different sectors of the city. At 5.32 p.m. the order to withdraw was uttered by the brigade commander from his tank a few miles outside the city. At 6 p.m. the city was clear of all tanks. Each battalion withdrew outwards, by its route of approach, then circling round to reunite in harbour a dozen miles south of Savernake. By 7.40 p.m. they were entering this harbour—well out of reach of any vengeful pursuers save of their own mechanized breed. Here the men had a well-earned meal, and would in war have stayed the night. Brigadier Hobart had still another test for them, and soon after darkness had fallen the brigade moved out in three columns on a fifteen-mile march across country without lights—it was accomplished without a hitch in just over two hours.

The work of the light-tank battalion deserves a special note. After a rapid bound of over twenty miles, covered in little more than an hour, to block the northern exits of Savernake City, it flung out a twenty-five-miles screen of patrols on an arc from Calne through Chisledon to Hungerford, to gain early warning of any hostile reinforcements. And while this outlying screen isolated the city

that was being wrecked, the light-tank battalion commander, like a spider in the centre of his web, was constantly and instantly through by radio-telephony, with one link, even to his farthest patrol at Calne, eighteen miles distant by road from him.

Noteworthy also is the method of 'harbouring' which has been evolved. It is impressively neat. When the brigade commander has decided where he wishes to lie up for the night, the Brigade Intelligence Officer and the seconds-in-command of the battalions (who act as 'harbourmasters') go forward at the last halt but one to reconnoitre the area, and allot sub-areas to battalions. The harbourmasters then 'track' back to a prearranged rendezvous, where they meet the unit guides—who are likewise in light tanks—and lead them into the battalion area, where company sub-areas are allotted. The unit guides, each flying their company flag, then sally forth, and meet the different battalions outside. Each guide places himself at the head of his particular company or similar unit, and leads it straight to its allotted part of the harbour. This military operation has a thoroughly nautical air. The light battalion remains out as a screen until the harbouring is complete, when each medium battalion becomes responsible for its own local protection. In harbour, the principle is that each company of fighting machines has its own packet of transport lying with it, so that there is the least possible portage of supplies.

The next exercise was a test in forcing the crossings of two river lines and a canal in face of the anti-tank guns of the 7th Infantry Brigade; it also brought out, unintended, the limitations of the light compared with the medium tanks—on one occasion where the former were baulked by the double obstacle of a wide ditch and steep bank combined, the others took it in their stride.

The ninth exercise formed the biggest strategic manœuvre yet attempted, a long-duration move which included all arrangements necessary for the maintenance,

repair and recovery of machines under war conditions. The greater part of it was covered in the darkness, yet the average speed was only one mile an hour less than is normal in daylight.

The general idea of the scheme was a continuation of that which governed the sixth. The Tank Brigade was supposed to have been blazing a long trail of havoc in the areas of the hostile army. But at last the time had come —and was perhaps overdue—for it to make its own 'get-away'. Its far-spread menace had drawn an important part of the enemy's force away from the front, especially the tank battalions and anti-tank units.

In order to withdraw to his own side of the line, before he was hemmed in, the Tank Brigade Commander thought to throw the enemy off the scent, and open a way home for himself by Cirencester and then round the north flank. The chief obstacle was that the enemy tank battalions were reported to have been detrained in this area. To draw them away and then cut across behind them, the Tank Brigade again moved south-west—as if to threaten Yeovil or Wimborne. Leaving its harbour near Tilshead just before 9 a.m., it ran openly across the Plain and along the roads beyond in two columns. A little short of Wincanton the bulk of the brigade turned sharply south-east, passed Shaftesbury and eventually went into harbour in Cranborne Chase early in the evening. Meantime, the 2nd Battalion continued its westward path as far as Castle Cary before doubling back, now dispersed into six small packets, to rejoin the brigade. Thus it was hoped the enemy would still be persuaded that both Yeovil and Wimborne were ominously threatened, and would expect news of attacks on these places.

Far otherwise was the idea of the Tank Brigade Commander. The enemy aircraft had followed his course all day, but no watchful eyes in the air saw the brigade emerge in the morning. By daylight it was in a fresh harbour thirty miles to the north-east, after a long deceptive

circuit. Moving from Cranborne Chase soon after midnight, the brigade had travelled in two columns along a curving patch that first went south-east, then veered north-east and finally north. The march was made in a slight mist, which deepened as dawn approached. But this did not appreciably check the tanks, and it had avoided any chance of their last lap into harbour being observed by hostile aircraft. By 7 a.m. they were hidden in the woodland midway between Salisbury and Andover. To this point the medium tanks had covered, on an average, 100 miles, and the light tanks 130—within the twenty-four hours.

All day they lay in hiding, whilst hostile aircraft scoured the West of England in search of them, for many hours with no clue to their whereabouts—since they had vanished into Cranborne Chase the evening before. It is worth remark that, although the presence of 'tanks' had been reported there, the report did not suffice to locate the Tank Brigade as a whole. For aught the enemy command knew, the tanks seen there were no more than a fragment purposely detached for their deception.

Darkness had again fallen when, shortly after 9 p.m., the brigade moved out in two columns, one going north and one west, to reunite in a fresh harbour just north of Salisbury. By 11 p.m. it was entering harbour, and at midnight the process was complete. At 1.30 a.m. it broke harbour, and made a fresh night march to Tilshead, where it was all in by 3 a.m.—having added another twenty to thirty miles to the distance covered in the forty-two hours' manœuvre.

Two other features of the exercise call for mention, because of the comparison they offered between mechanized and unmechanized troops. One was that the light-tank patrols made cavalry appear painfully slow as a means of obtaining information. Perhaps the most striking performance was at the outset when the commander, then at Tilshead, wished to discover if there was any menace

gathering near Bath—nearly thirty miles distant by road. A light-tank company was sent thither to reconnoitre, and in one and a half hours the news he sought was relayed back over the wireless telephone from the advanced patrol.

Again, no infantry force can bivouac as simply and securely—at least from hostile troops—as the Tank Brigade harboured, despite the difficulty of moving in during the night. Thus, near Salisbury, the chosen site was formed by a three-quarter mile of a double-banked avenue of trees. The tanks arrived in two columns, both from the north, and it was decided that on leaving one should go southward in order to take a deceptive route.

So in one column the tanks turned right, through a gap in the trees, into the bordering field, and spread themselves down the outer edge of the right line of trees, each company being led into its allotted position by its company guide tank. Meantime, its transport vehicles moved straight down the road, and halted along the inner edge, so that each packet of transport was alongside and under the sheltering wing of its own company of tanks—which was ready to swing outwards and cover the open fields in case of attack. And on breaking harbour, this column moved straight out to the south.

In the other column, the tanks first ran down the road, turned through a gap at the bottom, and up the outer left edge of the trees, while its transport went down the field and then turned up the road—so that the whole column was pointing northward.

It was extraordinarily impressive to note the expeditious way in which this harbouring, and breaking harbour barely an hour later, was achieved in pitch darkness—save for dim green sidelights—by some two hundred tanks and all their transport vehicles.

With the conclusion of the Tank Brigade exercises, the brigade was taken for a different experiment. In this it formed part of an assorted 'Mobile Force', of which the other principal ingredients were a mechanized infantry

brigade and a mechanized artillery brigade. Reviving the original 1927 Mechanized Force experiment on a larger scale, it proved a similar disappointment. The mixture did not become an amalgam.

The Force assembled west of the Severn, near Gloucester, and was directed (by the scheme) against certain closely grouped objectives supposedly behind the enemy's front. These were protected by a larger if less mobile force consisting of the 1st Division and the 2nd Cavalry Brigade. Unfortunately for the invaders' chances of striking unprepared defences, the scheme did not allow them to move until 2 a.m. (on September 19), so that they had barely four hours before daylight. This proved the greater handicap because the Tank Brigade had become so accustomed, perhaps too accustomed, to moving in the dark. Some seventy miles separated the Mobile Force from its objectives, with a river and canal line to cross within reach of the defenders; another thirty miles must be allowed for the immediate withdrawal to get out of reach after the stroke; and it would be wise to allow a 50 per cent margin for detours in avoiding obstacles and in the tactical operations. Such a distance was possible for the new light tanks and also for the bus column. It was not possible for the old medium tanks; after sixty or seventy miles they require a prolonged pause for 'maintenance' work.

This limitation hampered the commander's planning, and the possibility of a speedy non-stop stroke. Thus he decided to open the way with the motor-borne 7th Infantry Brigade, leaving the Tank Brigade to follow next evening. The normally sound habit of operating with this brigade as a whole hindered the idea of splitting it up to suit a particular case. And lack of suitable cover midway, where the brigade might lie up during daylight, was considered a bar to moving it up to be closer at hand. To these decisions can be traced what followed, but they sprang from a less palpable flaw—that in 1934

our one Tank Brigade should still be in part a collection of mechanical antiques.

Starting in the early hours of the 19th, the infantry motor column made a seventy-mile circuit and arrived soon after dawn at Hungerford, where it secured a bridgehead across the Kennet and Avon Canal. On the way it had passed through the enemy's armoured-car screen, tenuous but tenacious, which gave prompt and detailed information to the higher command—with the result that the troops holding Hungerford suffered all day from air-bombing attacks. During the night, the now immobile infantry motor column was joined by the Tank Brigade, which only left Gloucester in the afternoon. All the next day, the 20th, the Mobile Force stayed around Hungerford in its entirety and in immobility—and its troops were none the happier for being together. For the culminating exercise of the Army tended to become an indirect lesson in the power of the Air Force.

The intended stroke of the Mobile Force was never delivered. This unfulfilment was caused partly by the delay which had allowed the enemy time to raise a thick-set hedge of anti-tank defences that greatly increased the risks of assault. But it was due also to restrictive orders which compelled the return of the force in time to assist in the imaginary main battle on the 21st. Thus, on the evening of the 20th, measurement of time and the enemy's counter-measures precipitated a withdrawal.

Yet there was significance in the fact that, even in this frustration of mobility, mobility was the means. This applied not only to the enemy's aircraft but to their ground troops—and to the tactical sense of the commander, Major-General J. C. Kennedy. Not content with static defence, he determined upon active interference with his would-be assailants, to cripple them at a distance. With infantry in lorries he seized a bridgehead at Marlborough on the flank of his opponent's at Hungerford; and from this he pushed his cavalry, sup-

ported by infantry in lorries, round the rear of the 'Immobile Force'. This move in turn covered the audacious activities of the 1st Division's mechanized engineers, who spread a network of road-blocks and minefields across the invader's natural lines of retreat. It is questionable whether, in real war, unarmoured troops would have ventured so blithely into a pool of crocodiles, but the intention was praiseworthy, for unless audacity is cultivated in peace it is unlikely to flower in war. General Kennedy's hope was that, when the enemy tank and bus columns withdrew, he might shepherd them into one or two narrow defiles, where they would be trapped and smitten by his own air bombers. Thus the débâcle of the Bulgarian, Turkish, and Austrian retreats of 1918 might be repeated.

The trap seriously disturbed the retirement of the Mobile Force, but did not avail to destroy it—thanks to its mobility, when once in motion. The commander had a shrewd idea of the barrier raised behind him, and his plan of withdrawal embraced a three-route circuit around it to the eastward, before retiring west to his new laager beyond Swindon. Despite the increased distance—the outermost column had to cover nearly sixty miles—and the difficulties of extricating such a mass of vehicles in the dark, the withdrawal was effectively accomplished by the next morning and the force regrouped in its new area. Owing as much to the artificial impositions of property in peace as to the enemy's interference, the move of the tank units on the inner circle appeared at one time to be near dissolving into chaos. But the outcome proved the deceptiveness of appearances. Indeed, on reflection, the most significant feature of the whole test was the way in which, when a body of tanks had been thus broken up, the fragments were able to find alternative routes around obstacles, and come together again so quickly—like globules of mercury.

Similarly, with the mission of the Mobile Force, apart

from the causes of the miscarriage already traced, there was one that lay deeper. For, although the scheme provided a number of objectives, these were so close together as to form, strategically, a single objective. This fact cramped the variability of aim which is not only a condition of surprise but the strongest card that a Mobile Force possesses. In actual war, the long line of the railway communications behind the railhead at Salisbury would have been a more vital objective than the bunch of headquarters, aerodromes and dumps around Netheravon—and more difficult for the defending forces to cover. Moreover, the interior of 'Eastland' would have been littered with other targets—the sinews of war upon which a defending army is dependent but which a raiding force may sever.

No peace test can reproduce the confusion and dislocation which a hostile inroad can produce in the civil as well as in the military back areas. In this vital aspect, there is more to be learnt, save in technical details, from a study of Sherman's march through Georgia and the Carolinas, and of its deadly reaction upon the opposing army.

CHAPTER XIV

LOOKING AHEAD—AND BACK

In a military journal of 1934, I read an anti-mechanization article somewhat strangely named 'Looking Ahead'. It reminded me of a recent experience—when I came upon a volume of cuttings, yellow with age, which related to speeches delivered and papers written by my great-grandfather a century ago. He was a pioneer of railways and instrumental in starting the first railway in the West of England. It was amusing to find that his arguments on behalf of railways had been very similar to my own in regard to military mechanization. It was equally amusing, and illuminating, to find that he had been met with counter-arguments still more parallel to those that are advanced to-day against the mechanization of armies!

My own definite acceptance of the inevitability of mechanization—and perception of the advantage of taking the lead—dates from 1921. Then, as the author of the post-war *Infantry Training*, and of various unofficial treatises on infantry tactics, I was asked to take up the challenge that the tank offered and draft the case against mechanization. The arguments I found seemed to satisfy those who read my paper. But they failed to satisfy me. And from that moment I was forced, in honesty, to do my best to make clear the case for mechanization.

Thus, it has been rather depressing to see year after year the old arguments trotted out against mechanization. It does not encourage the hope that armies will ever keep pace with changing conditions, or ever learn

the chief lesson in history—that they have never yet changed their own organization in time with the need.

But it was still more depressing to see, in 1934, arguments against mechanization that one deemed too flimsy for use when trying to draw up the case against it thirteen years ago. For example, it did not take much foresight, even in 1921, to assume that 'sooner or later an efficient anti-tank gun will be produced'. But to treat that as a serious argument against mechanization seemed absurd when one remembered that, when efficient armour-piercing shells were produced, navies did not revert to wood—and still less to sails.

Again, one considered in 1921 the question of the power of infantry to overcome modern defences, and whether 1918 experience justified the argument that 'well-trained infantry, when adequately supported by artillery, proved their ability to do this right to the end of the war'. It did not seem honest to use such an argument—it was too palpably a quibble. The success of attacks had so clearly depended on the artillery, or on tanks, to paralyse the resistance in the area which the infantry subsequently occupied.

Another line of argument which collapsed under examination was that mechanized troops would 'require more transport' than ordinary troops. One found that the question had actually been studied at the War Office in 1918—too late, unfortunately, to have effect before the war ended—and that calculations showed that if all transport were converted to a mechanical basis, the horses and the men to look after them being eliminated, the daily requirement of food for a division would be reduced by over two-thirds.

Other fundamental facts discovered were:—

1. That five times as much 'fuel' is required to move a ton of supplies 100 miles by horse transport than by motor transport.

2. That a ton of petrol occupies only 48 cubic feet of

space, while a ton of compressed hay occupies 270 cubic feet, a ton of compressed oats 70 cubic feet, and a ton of compressed straw 416 cubic feet. The saving of transport with motor fuel as compared with horse 'fuel' was obvious.

3. That, during the war, forage was the item of supplies which placed by far the heaviest strain on our shipping resources, and consequently did more than any other to endanger our position in face of the submarine campaign. To the armies in France nearly 5½ million tons of forage were shipped—more even than the tonnage of ammunition—compared with only three-quarters of a million tons of petrol. In fact, to meet the demands of our army for forage had required over twenty times the transport space as its needs in petrol. Turning to the Palestine theatre, one found that four times the tonnage of supplies was being sent to Kantara to feed the animals as to feed the troops themselves—a significant comment on the assertion that horses, unlike motors, may live on the country.

Yet nearly a generation later one sees the persistence, or the resurrection, of this long-exploded argument that a mechanized army requires more transport than an army with horse transport. Its revival is the more astonishing because of the progress achieved by tanks and other mechanized vehicles in economy of maintenance. The author of the article in discussion categorically declares that 'armoured fighting vehicles on the move require more transport to supply them than an equivalent force of cavalry and infantry'. Does this bear any relation to the facts? A tank brigade is approximately equal in fire-power to an infantry division—it can bring to bear a greater volume of fire at a given time and place. Yet a tank brigade requires only a tenth of the man-power and a sixth of the motor transport, while it eliminates altogether the use of the 5,000 animals and 740 horsed vehicles that the infantry division requires. Moreover, it can at need move 100–150 miles without any transport

at all, while a mere twenty lorries suffice to refill it with petrol to cover double the distance.

Here are facts that any conscientious investigator can discover. How many of those who discuss the pros and cons of mechanization have troubled to ascertain them? One should not perhaps be surprised that a casual critic has not done so, for one has found that generals directly concerned with the organization of the Army were unaware of them.

The only hope—and history unfortunately suggests that it is a slender hope—of adapting our organization to changing conditions lies in a scientific analysis of the facts and an *attitude* detached from all prejudice. The first test of this is a readiness to state the argument fairly in any case one is examining. But when the sceptic who speaks of 'looking ahead' sets out to study the question of an attack by an all-tank army upon a force of all arms, he opens with the remark 'However successful the first wild onslaught . . .' Why wild? With a single adjective he jeopardizes the expectation that his analysis will be a scientific inquiry into the problem. A similar obliquity mars the value of his insistence on 'that vital truth: Proportion'. For the fact that we have only 6 tank battalions, compared with 136 infantry battalions, although the cost of each kind is approximately equal and a tank battalion stronger in fire-power, suggests a very marked lack of proportion in our present organization.

It is highly probable that, with such a deficient proportion of tanks, they would be used up in the first clash of a campaign, and that 'as in 1914, a stalemate would ensue'. The sceptic may take this probability as confirmation of his arguments. And past experience certainly suggests that it would be used as an excuse for proclaiming the inadequacy of tanks. From a reasonable point of view, however, it would merely be proof of a defective sense of proportion in our own minds.

Proportion, truly applied, would seem also to show a

fallacy underlying the argument that 'it is to increase artillery therefore, rather than tanks, that any available funds should be devoted'. For it is an accepted fact to-day that the present artillery of a division is only sufficient to provide a barrage on a front of one battalion—out of twelve in the division. Hence we should have to multiply the artillery at least sixfold to provide a barrage for a full divisional attack (with three brigades each attacking with two battalions, or two brigades with three battalions). Even this, by 1918 standards, would not nearly suffice. For present barrages are calculated on the basis of a gun to twenty yards of front, whereas in the later part of the war we usually had one gun to each ten yards and frequently to each five yards! The immense cost involved would seem to rule out the possibility of increasing the proportion of artillery twenty-four times, or even six times. And if we could afford such an increase it would only solve half the problem—that of breaking into the enemy's position. Artillery hinders rather than helps the second half—that of breaking through—because it ploughs up the ground over which the further advance has to be made.

The problem is complicated by the growth of air-power. In face of air attack, I cannot see this mass of artillery ever reaching the battlefield. Even the present division is hopelessly unwieldy and an all too easy target. There are two dominant facts in the present situation. First, the Army has practically no power of attack in face of enemy machine guns on the ground. Secondly, it may be immobilized by attack from the air. In seeking a solution it seems hopeless to try one that increases the second danger in trying to reduce the first. If there is any way out of the impasse, it can only be through reducing the bulk and increasing the mobility of the land forces. To load an at present helpless mass of infantry with a cumbrous mass of artillery is likely to produce a fiasco.

If we are ever to tackle the problem we must first clear

the ground of false arguments, or the debris of arguments whose frailty was perceptible, fourteen years ago. There are sufficient real drawbacks to mechanization without dragging in the unreal: factors which make it a dangerous, if none the less an inevitable, process. Chief among these I would put the psychological factor. From observation, I am inclined to think that, apart from certain minds of exceptional adaptability, we may not find officers capable of handling high-mobility forces until the new generation, born in the motor age, has grown up. Without the necessary mental adjustment inefficiency, if not chaos, will be produced when such forces take the field. Here lies the peculiar danger of our present idea of waiting upon events, and maintaining the Army in its old-style pattern, with the expectation of transforming it after war has come. Unless there is an adequate proportion of mechanized fighting vehicles in peace training, with which to develop a mechanically mobile sense, we are inviting breakdown if we attempt a hurried transformation under the stress of war. Such a sense grows by experience: it cannot be a forced growth.

CHAPTER XV

THE MODERN TERRITORIAL ARMY—ITS STRENGTH AND WEAKNESS

The Territorial Army is typical of the nation from which it springs. For it defies logic. Its members sacrifice their leisure and more, not merely in a spirit of duty, but with an enthusiasm which accords neither with logic nor with the usual estimate of human nature. Even professional soldiers whose scale of reward bears little relation to their degrees of work, are often astonished at the zest with which the citizen-soldier throws himself into unrequited toil. To do a job because it must be done, to 'grouse' but carry on, is an attitude which can be understood. But to throw oneself into the sacrifice with such unmistakable pleasure—! Indeed, not content with devoting most or all of his annual rest from civil occupation to strenuous training in camp, the Territorial officer has a habit of sacrificing most of his night's rest as well, by repeated guest-night acrobatics which leave but a few hours' interval for sleep before the reveille of another energetic day on the training areas.

The Territorial Army, again repudiating logic, has maintained its vitality despite the fact that Government encouragement has been limited to occasional faint praise, unaccompanied by practical generosity or by those forms of recognition which cost nothing—except vision and understanding. So far as Parliament is concerned, the past years have been marked by lamentations on the one hand—over the Territorial Army's weakness of numbers—and by reductions on the other. Yet the Territorial Army survives. It is surely one of the hardiest of British

plants, as it grows in financially stony soil without even being watered by moral encouragement.

It is a truism that the Territorial Army is the cheapest form of national-defence insurance. And the War Office has laid down as a principle that it is now the foundation of any future military effort on a national scale. Yet this foundation has been repeatedly chipped away, without any official statement of policy to suggest that reductions are a means to reconstruction, to the end that decrease of size may be balanced by increased efficiency for modern war. Moreover, reductions were too often announced with a minimum of consideration and courtesy.

Although the spirit has risen phœnix-like from the ashes of each fresh trial, the numerical strength has shrunk. The most marked reduction could be traced to the reduction of the bounty. The harm, however, can be exaggerated. When one first visited the Territorial camps, the contrast between camp attendance and paper strength was greater than to-day. If strengths have been reduced, they have also been refined. There has definitely been an improvement in the quality of the personnel, especially in the units near London. The withdrawal of the bounty at least had the beneficial effect of ensuring that those who join do so more from love of soldiering or sense of duty, and less from monetary considerations. An even better omen for the future is the better type of officers. A few years ago the outlook was gloomy, and the public-school boy seemed to have abandoned his old birthright of service for a mess, not of pottage, but of pot-hunting. Now, the quality of the subalterns is noticeable, and the only shadow is the rapidity with which faces change, through the departure overseas of many promising young officers who find that youth's civil opportunity is becoming more and more limited at home.

Nevertheless, while pessimism over falling strengths is often misplaced, optimism is a product of short sight. The metropolitan units have improved in quality, some-

times even in strength, but they had the most leeway to make up. Some of the provincial battalions, which were both strong and good, have fallen appreciably below their former level. Moreover, in the infantry as a whole, even the undoubted rise in the quality of the men is not proportionate to the need imposed by the conditions of modern warfare. The formation of machine-gun companies seems to have emphasized this relative deficiency —of intelligence. Apart from the artillery and technical units, which form only a fraction of the total strength, the Territorial Army is largely recruited from a class corresponding to that which composed the old Militia, rather than from the business employees and skilled artisans who were prominent in the pre-war Force. Die-hards who utter the parrot-cry about man versus machine ignore the fact that all fighting men to-day are users of mechanical weapons, and that, the more highly developed the tool, the higher is the demand upon the capacity of the man who handles it. This inevitable demand for higher-grade men is the shoal upon which the Territorial ship is to-day in most danger of running aground.

Thus we pass, naturally, from the question of strength to that of standard. First, how does the efficiency of the Territorial Army compare with a few years ago? Here it is necessary to draw a sharp dividing line between infantry, the bulk, and the other arms, particularly the artillery. Perhaps, as an infantryman, one is inclined to view more charitably the work of an arm one knows less. But the all-round advance in its level is too clear to be discounted. Mainly it is due, of course, to mechanization. For this has abolished the main trial, and drain of training time, which the artilleryman suffered—breaking in the horse-teams. The trouble was chronic, and was growing worse with the decline in the breeding of light draught horses. Both drivers and horses came fresh to the job for their fortnight's passing acquaintance. To train a horse-driver in the Regular artillery takes some six months,

and even he would be nonplussed if he had to handle the untrained horses which fell to the Territorial. Before mechanization became general, most of the brief annual fortnight was spent in training the horses instead of in training the men for their real job as gunners. And when the men came in tired from wrestling with these intractables, they had to feed, water and groom them, whereas now they can simply put their tractors away and feed themselves.

The battery staffs in many cases were still mounted for some time after the batteries were mechanized, and some officers would prefer them to remain mounted. The compromise is of questionable wisdom, for even those who support it admit that it would be abandoned if the batteries went on active service. Then why practise in peace what would be radically altered for war? To do so is not merely illogical, but unpractical. Moreover, the compromise hampers mobility, as is clearly seen when the 'mixed' artillery accompany motorized infantry columns. While the batteries can move ten miles in the hour, the battery staffs cannot. Admittedly, the vehicles at present available for conveying battery staffs are not ideal, but their very deficiency teaches adaptability—making their users more expert in the art of choosing routes and of judging when and where to quit the vehicles. And the testimony of those brigades who early adopted complete mechanization is remarkably strong in its favour.

Before leaving the subject of the Territorial artillery, there is a point about their camp sites which deserves comment, because it reflects curiously upon the prevalent infantry cry that seaside camps are essential for recruiting. Even the best of the artillery practice camps—Larkhill—would provoke gloom among the infantry, while Okehampton and Trawsfynydd would be viewed as almost equivalent to a sojourn in a penal settlement. Yet the Territorial artillery in the south and midlands is able to keep up its strength with greater ease than the infantry.

The contrast arouses curiosity as to the cause. Perhaps the explanation is that, for the gunners, the realism of their training outweighs all drawbacks. Live shells inspire 'live' interest. The Territorial at practice camp is conscious that he is not playing at war, but instead approaching the 'real thing' far closer than his infantry comrades. This deduction is strengthened by one's experience that in such infantry brigades where soldiering is made the keynote, and tactics are taught with an eye both to ground and interest, camp attendance does not fall off when the men are taken to a camp that is chosen primarily for its training facilities. More men join the Territorial Army because they love soldiering than senior officers are apt to assume. And the cry for 'holiday camps' is usually strongest when the art of training is weakest.

Perhaps the most impressive, as a class, of all branches of the Territorial Army, are the yeomanry Armoured Car Companies. Their enthusiasm could not even be damped by years of being shackled to the antique Peerless cars, which were not only a Job-like trial of patience, but violated the deepest instincts of a cavalryman by their immobility and frequent immovability. They suggested a mechanical cross-breeding between the donkey and the hippopotamus. Now with the part provision and part loan of Rolls-Royce cars, relicts of the Regular Army, the cavalry spirit has been unchained. It will have still more scope if the companies can be equipped with the light six-wheeled armoured cars, whose cost promises to be hardly more than that of fitting a mock-up body to an ordinary six-wheeled lorry, or with light tanks.

Lastly, we come to the infantry. Has its efficiency improved and is it adequate? With the Territorials the critic finds candour harder as his acquaintance grows, because of his intensified admiration for their spirit and their sacrifice. But as a preface to frankness, one would remind one's Territorial friends of Thackeray's say-

ing—'Choose a good disagreeable friend, if you be wise.'

From a national point of view, the Territorial infantry's value is great, as a leaven of good citizens. Public money devoted to the Territorial Army is money spent for peace as much as for the contingency of war. From a military point of view, one found an improvement between 1924 and 1926 which took the form mainly of gradual release from trench-warfare habits of the world's worst phase of infantry tactics—the Somme phase. But between 1926 and 1929 there was no discernible advance in the tactical efficiency of the Territorial Army as a whole. And tactical efficiency is practical war efficiency. The day of the barrage-following and position-occupying infantryman has passed. It would take at least a year of war and munitions expansion before we could produce the barrage for them to follow. Such 'heavy' infantrymen, even if necessary or useful, can be intensively trained in a few weeks. To use them in the early stages of a war would be merely to pile up the battlefield with corpses, and the national debt with pensions. The only infantry able to live, let alone to be of use, on the future battlefield is the light infantryman, the skilled skirmisher.

In recent years, however, one has noted appreciable advances in the tactical standard, an advance perhaps most marked in the London units whose 1926 level had been lower than elsewhere. Generally, the precepts of the manuals this year have been better applied, and the 'mechanism' of orthodox tactics better fulfilled. There has even been more attempt to recall the hard experience of the last war, and to insist on its observance in tactical exercises. One would not imply that the cult of realism is common, any more than it is in the Regular Army exercises. But one has at least seen real efforts here and there to impress troops with the stopping power of machine guns, to discourage suicidal attacks over the open, and to revive the 'infiltration' which was the only method of

infantry advance proved feasible by the war. The best fruit picked from this field of experience, it had almost become dried fruit in recent years.

Another welcome resurrection has been that of practice in battle drill as a groundwork for tactics, and a means to develop the flexibility of units for manœuvre. Like so many reforms, once it gained a place in the training manuals, it was left there in the undisturbed repose which marks all mausoleums.

Lewis-gun sections are now, in general, used more intelligently according to modern ideas, although this very fact serves to accentuate the complexity of the existing multi-weaponed platoon tactics, and to underline the certainty that they would break down under battlefield conditions. Further, the indiscriminate use of section scouts—who cause delay, mask fire, break up the unity of the section, without compensating value—is less common than of old. They will hardly disappear, however, until a mild official permission is changed to an unmistakable official fiat. Custom is always stronger than reason, and the phrase 'send scouts ahead' is too easy a substitute for thought.

Another development has been a more general effort to reconnoitre the training areas before units go to camp, and to prepare schemes based upon the areas—if these schemes are still too often of a vague nature.

It is significant that the improvement in the average tactical level coincided with the first 'Territorial year'. The coincidence impels one to dwell at some length on this experiment of 1930.

The only qualification to its success arose from two contrasting conditions of Regular assistance—an inadequacy and a surfeit. In some cases the 'Territorial year' seemed to show no change from any other year. There was no appreciable increase in the number of Regular instructors and helpers from that which has become customary. Merely an odd specialist or so extra. In other cases

Regulars almost outnumbered Territorials—in officers, at least. A worse excess was where they tended to swamp the Territorials' training—either by an overdose of demonstrations, which left the Territorials scant time for their own exercise, or by taking over charge and leaving the Territorial to be a spectator instead of an instructor.

But a happy mean was achieved more often than otherwise, and more often than was perhaps expected. For a successful combination demanded not only tact but an understanding of the problem. The solution was for the Regulars to be on hand to coach, advise, or umpire, without superseding the Territorials as commanders or trainers of their own men. The ideal was embodied in the motto in which one brigade actually expressed it—'to be always on tap, but never to butt in'. One important contributory factor to the degree of success achieved was unquestionably that the 'helpers' came to the Territorial units from the Regular battalion of their own or an affiliated regiment. Thus a natural bond of sympathy and previous acquaintance served to make relations more intimate. The ice of the Englishman's instinctive reserve required less melting.

In a number of cases an alternative method was adopted by which the Territorial battalion actually went to camp at the station of its Regular battalion. This was better still, so long as the measure and form of help was wisely adjusted. It should, moreover, be recognized that the War Office, with unwonted elasticity, allowed the Territorial units to make their own proposals and tried to meet them, however diverse they were.

In what ways can 'corporate' co-operation be improved in future? First, by a uniform care to ensure that the Regular helpers have the requisite tact and training gifts for the task—and are keen to go. Volunteering is better than detailing. An officer who shows his discontent at the discomfort and expense of being under canvas with the Territorials—and these factors are felt—undoes the

good impression made by many others. The Regular is not always so habituated to the idea of sacrificing his own convenience as the Territorial—who would never serve at all unless he had this instinct. If fewer Regular officers were lent, it would be easier to ensure that all were suitable. Next, one would make the point that, apart from specialist coaching, the most profitable use of Regular officers is in preparing schemes and in umpiring. This fact in itself makes it essential that those selected should be more than average tacticians.

The tactical training of Territorials has suffered, above all, from a lack of method in preparing schemes and a shortage of umpires to control their execution and 'paint the picture'. Some years ago, a brigade commander in East Anglia spent several days before camp studying the training areas; dividing them into battalion, company, and platoon areas; working out a scheme for each; and fitting the smaller into the larger to form a tactical mosaic. The benefit produced by this method was more marked than one has ever seen before or since. Not many brigade commanders have the inclination, nor, perhaps, are they sufficiently steeped in minor tactics to do such minute preparation. Territorial battalion and company commanders, even if they have the knack, cannot spare the time before camp, and are busy enough as it is during camp. Adjutants have burdens enough already. But if officers who were being lent from the Regular battalion could spend several days reconnoitring the area and preparing such schemes before camp, their help might be even more useful than during camp. It would, of course, be simplest for them to do this, if the Territorial battalion came to their station. And in this arrangement, I feel, lies the solution of other difficulties.

Its defect is that it would to some extent break up the normal organization of training. Hence it would be best, and sufficient, to have these dependent-independent camps at intervals of two or three years.

The method might also conduce towards another improvement—which is perhaps the most useful of all forms of help—the loan of equipment. It is a need which past years have done little to satisfy. The supply of modern, and particularly mechanized, equipment to the Regular Army is more like 'the gentle dew from heaven' than a thirst-quenching draught. But the plight and paucity of the Territorials is far worse. The artillery and signals have been able to mechanize by improvisation, but the equipment of the infantry is inadequate as well as archaic.

At one or two stations where Territorials were in camp, the Regular garrisons have in recent years provided demonstrations of modern warfare with mechanized weapons. Such demonstrations were much appreciated, although only a fraction of the citizen force enjoyed them. But still more appreciated would be the loan of such modern equipment as armoured machine-gun carriers for use in some at least of the ordinary company and battalion exercises, and a proper scale of machine guns and limbers throughout the whole fortnight. Moreover, such loans, and such draughts of modern warfare, might help recruiting, which depends so much on interest of training.

Loans would help, but loans will not suffice for long—or really satisfy. There is a growing clamour for the provision and possession of modern equipment. The enthusiasm of the Territorial can only be kept up, and the Territorial Army is only worth keeping up, if it is kept up to date. One of the most important needs is the mechanization, or at least motorization, of the infantry machine guns. Limbers drawn by hired horses with unaccustomed drivers are as great a handicap, and often offer as sad a spectacle, as formerly in the Territorial artillery. Just as mechanization has raised the standard of the latter until it is well ahead of the Territorial infantry, and attracted a higher type of recruit into the

ranks, so it surely would in the infantry machine-gun companies.

Last year some Associations hired lorries for their units. In other cases the Territorials appealed for them only to meet the ban of the authorities. Personally, I see the best tactical solution in the use of 'Baby' cars rather than of lorries, but the latter are necessary to transport complete sections, and it is certain that with city units the provision of such motor transport is the only way of getting them out into the country for training during the winter and spring. Associations which earlier paved the way to artillery mechanization by purchasing six-wheelers might repeat such far-sighted financial aid in promoting machine-gun mechanization.

Such infusion of modern interest into training is different from, and more profitable than, the artificial stimulus of combined exercises. These were popular in 1924 and earlier, until the obvious failings of the sections and platoons working in them led thoughtful officers to join in a campaign for 'concentrating on essentials'. By 1926 this had produced unmistakable benefits. But in the last year or two the pendulum has swung back from elementary towards advanced exercises. There is a decided, though not universal tendency to cut down the days of section and platoon training in order to increase the number of battalion, brigade, and even divisional days. With combined exercises a safe rule is that one in a fortnight acts as a tonic, but more, as a poison. One battalion and one brigade day is ample, unless the programme is arranged over a several years' sequence, one year concentrating on section and platoon training, the next on company training. In that case—only—the third year might, with profit, include several battalion days.

More time and thought should certainly be devoted to section and individual training—here lies the greatest weakness of the infantry to-day. At present, this is usually scamped, because the teaching of it is too unimaginative.

If, individually, men and sections trained competitively in advancing over different types of ground with the least exposure, and also in taking up the best fire-positions, every day so employed would be worth several spent in more ambitious exercises. Some time ago a famous general declared that modern infantry tactics should be similar to those of Boy Scouts playing in the hedgerows. The hint might well be taken as a guide in section training. In raising a battalion for modern war, one would, to speak candidly, prefer to pick the section leaders from youths who had been Scouts than from the average Territorial battalion—or O.T.C. Contingent. Officers' Training Corps, of the Junior Division at least, seem to have a bent for parade training at the expense of the more interesting and vital tactical side of training. And the real robots to-day are not the men of the mechanized arms, but the infantry. In the making of a practical—a tactical—soldier, smartness is the cement, but not the bricks. Those who doubt this may be reminded that at Biddulphsberg a mere eighteen Boers defeated two battalions of Guards.

The difficulty with the training of infantry is that one deals with so few concrete elements. To train tactically minded infantry is to exercise an art, whereas to train gunners is to apply a science. The man in the ranks of the artillery, the tank corps, the signal service, is primarily a technician, executing a concrete task in a definite manner. But the infantryman's use of his tools is only complementary to the use he makes of ground and ruse. His training depends on an eye for country, knowledge of human nature, imagination, and not least a trained sense of what is and what is not possible under modern fire conditions. For the last represents the difference between minor tactics and major 'cenotaphics'.

When the official infantry doctrine came to be recast from war experience in 1920, it was realized that a successful infantry advance was possible only on one

condition—that there should be an overwhelming fire support such as is non-existent to-day. This condition was that the terrain should afford scope for, and the sections be capable of, infiltrating into the 'soft spots' of an enemy position by dint of the concealment and 'rusiness' of their approach. To allow room for such manœuvre-tactics the battalion was to be distributed over a frontage as wide as 1,500 yards and a depth as great. And this extension was based on the assumption that the auxiliary fire-support would approximate more to the standard of 1918 than to its 1932 exiguity. Otherwise it would have been wider still. For the less the fire-support the wider should be the frontage allotted—not actually to distribute the battalion more widely, but to give it a wider choice of avenues of approach, avoiding altogether the more exposed sectors.

As one who was jointly responsible for the post-war doctrine, I can only say after ten years' observation that although the letter receives customary homage the spirit is but rarely fulfilled, in attack exercises—either in the Territorial or in the Regular infantry. Platoon training may be excepted. If a battle was run on the lines of a boxing tournament, with each platoon taking the ring successively, it might be won on aggregate points. But it is the exception to find any battalion wherein correct platoon tactics are fitted into the larger framework of a battalion attack. The typical battalion, or larger, attack, soon becomes as linear a procession as in 1914. The sections usually try to use any cover which lies directly in their path, but so they did in 1914. They are rarely given time or space to use it as does a stalker or poacher, and, as the advance progresses to close quarters, they thicken up into a 'firing line' hardly distinguishable from that of 1914. And still more than in 1914 are they but swathes of human corn ripe for the machine-gun reaper. We have forsworn the old shibboleth of weight of numbers, and yet in practice it is constantly repeated.

We have still to learn that all other lessons should be subordinated to that of battlefield reality. The difficulty of unlearning a wrong lesson is proverbial, and nothing can compensate the harm of giving troops the impression that they can do what in war would be made impossible by bullets.

The historian may rightly criticize what is past without offering constructive suggestions, as it is too late for these to be of use. But those who deal with contemporary questions have not this 'behind-time' justification. Hence I would here outline certain steps which might help to improve exercises and to reconcile them with realism. Do not allow attacks to end with the assault, or be made against objectives arbitrarily selected as convenient finishing points. Whoever frames the scheme should put himself mentally in the place of the defender before he chooses the positions against which the attack is to be made. One still sees attacks made against a single objective, despite the fact that our defensive doctrine and that of every other country ordains that every position will be held by a series of localities and posts disposed in depths. Do not allow impossible attacks to continue merely to avoid spoiling the scheme—stop them, and make the commanders use their common sense in search for a more bullet-proof solution. Take the ground as it is, and frame your scheme accordingly, instead of 'imagining' it as you would wish it to be—the imagination of the men is not equal to your own and they will acquire unreal lessons. Even if three-quarters of your area is bare ground, insist that infantry can only attack through the quarter which gives cover, for one platoon here will at least achieve more than three platoons over the open—as these will only be machine-gun fodder.

One of the chief obstacles to realism, and to tactical skill, is certainly the habit of uniformity acquired on parade. One has even seen Territorial infantry wearing meticulously squared packs whose sharp angles caught

the eye and utterly undid the attempt to use cover during the advance. In order to learn what to avoid officers should train their eyes in evaluating degrees of visibility. For example, practical tests against different types of background reveal that 'arrowhead' is far less visible than an extended line, and so stamps the former as a lifesaving formation. Yet it is all too rarely used. Another fact, easily proved by test, is that an extended line is peculiarly liable to 'concertina' and so tends to more dangerous bunching in the ultimate stage of an attack than do formations which are originally more bunched. Whatever formation is used, remember that evenness of intervals and alignment is dangerous.

Rushes, a reversion to 1914, are certainly overdone nowadays. Units which regularly work forward by this method of section rushes catch the eye and draw fire almost as certainly as by the trench-war method of stately advance in waves—from which 'Crimean' absurdity they came as an intelligent reaction. We might profit by a study of Boer methods, or, if this lesson is too dim a memory, encourage officers to take a course in a Highland deer-forest. As a cheaper substitute, poaching might be recommended for the instruction of N.C.O.'s! For we need to develop the art of stealthy imperceptible advance by stalking methods.

On a higher scale, it is essential that more thought and practice should be devoted to the art of exploiting opportunities. Since the Army has ceased to speak of 'soft-spot' tactics it has gradually forgotten how to apply them. This oblivion suggests that even catchwords have their value as mental hat-pegs, and are at least preferable to mental haziness. One way to instil the art of exploiting the gap and 'expanding the torrent' is to frame schemes definitely to bring out the action of reserve units, omitting that of the forward units.

In Territorial exercises a common weakness is the sending back of reports. This is one of the worst handi-

caps to effective exploitation. Indeed, the practice of large-scale combined exercises by Territorial formations has at least the negative advantage that it vividly demonstrates the difficulties of obtaining information early enough and fully enough to be a guide to commanders in the employment of their reserves. It may thus induce officers to face the fact that the only chance of effective control lies in the method of liaison forward, instead of waiting for messages to come back. For, in the small units particularly, the commanders are far too occupied in directing the fight, to write out and send back reports until the crisis is over. And then it is too late for the superior commander to influence the result. The only practical remedy is for the latter to send forward competent officers or N.C.O.'s, according to the grade of the unit, whose sole duty shall be to watch the forward troops and report their progress. Such a diversion of personnel is better than a lost opportunity, or the loss of a hundred lives through want of timely information. In default of extra personnel, the battalion intelligence sections, now formed, can serve for this purpose.

From the object of training, we come to its organization. And here one proffers a possible plan, a development of that already carried out in the brigade I mentioned earlier. It is that, for each brigade, the training ground should be reconnoitred several weeks before camp and divided into areas adequate, tactically and spatially, for a battalion attack. They should then be distributed into company and platoon areas, not arbitrarily subdivided, but so calculated that the platoon areas allow adequate scope for realistic platoon tactics. Then one should prepare and duplicate, with simple sketch maps, schemes for each platoon-attack area, subsequently fitting these together into company schemes and finally into a battalion scheme. All such schemes should visualize the enemy's defence before they consider the attack. For each scheme a detailed 'correct solution' should be worked out, even

marking the successive positions to be occupied by each individual section and its route.

When the brigade comes into camp and begins platoon training, each platoon will be issued with its appropriate scheme. Only after it has carried this out should it be issued with the correct solution. It would then repeat the exercise, as a demonstration by itself to itself, made more forceful by comparison with its unaided initial attempt. On subsequent days the platoon areas would be changed round, working up to the company and battalion exercises.

It may be said that some camps have not areas adequate for such full-scale organization. In that case the answer is that, rather than forfeit realism, it is better to attempt nothing higher than company exercises. Again, it is certain that in any battalion area some of the platoon areas would be too exposed for the attack to be feasible under real war conditions. Instead of disregarding them, the platoon scheme should bring out the lesson that advance is not possible, and show instead what alternative action could be taken. To remind troops that Balaclava is out of date would not be a waste of a morning.

Time for teaching essentials is short, but would suffice if diversions were curtailed. One of these is the visitations of the mighty, who, if only because of the awe they inspire, distract attention from the ordinary programme. It would save much training time, and much marking-time, if there was one visitors' day in the fortnight for all generals other than the actual divisional commander. If they wished to come any other day they might wander round in plain clothes—when they would not be a distraction to the mind or the eye.

Another diversion is caused by competitions. One has come, indeed, to the conclusion that real value would be increased if all competitions were abolished in the Territorial Army, except tactical or, to a limited extent, weapon-training ones. The worst fault of competitions,

however, is moral—that they are an incentive to 'eye-wash'. Transport competitions are specially apt to be harmful, depriving the troops of their transport for training in order that vehicles, harness, drag-ropes, etc., may be kept in 'cotton-wool' for the great event.

A new and dubious diversion is that of embussing practice. It certainly costs the training grant far more than it yields in value. But it might be adapted to a better and wider purpose. For this, it needs to be organized on an army-wide scale, and might then overcome the worst of all present handicaps on Territorial camp training.

Inadequate and unsuitable areas, where the troops can really learn no more than how to be 'scythed' by machine guns, are the curse of most camps. The difficulty is that true infantry country, rough and wooded, is rarely found near the sea-side towns which many commanding officers consider necessary for a popular camp. A largely extended use of motor transport might enable the two opposing needs, camp site and training ground, to be reconciled—by conveying the troops out daily from camp to training area. Money would certainly be saved on taking them from home station to camp by motor instead of train. More might be saved by abolishing all horse transport. A good sum might be made by using the transport for evening excursions. And if anything more was needed to balance expense, the increased value of the training would certainly be worth even a reduction of establishments or of the number of days in camp.

The remedies here suggested might bring about a definite improvement in the tactical standard of the citizen army. But winter training, like camp training, needs more methodical organization. The standard reached in camp is mainly the register of the pre-camp months of preparation and education. The number of week-end tactical exercises carried out by officers and N.C.O.'s still varies extraordinarily in different areas.

And nowhere seems to approach the scale maintained by the East Midland Brigade some years ago.

In courses arranged for the benefit of Territorials there has certainly been development and improvement. The London Divisions are peculiarly fortunate in having the London District School of Instruction. Elsewhere, though difficulties are greater, more might be done in the way of command and divisional courses arranged and timed to suit the Territorials.

Attendance at Regular courses is a less satisfactory method. The work is too spread out and time is often wasted over non-essentials. One is sometimes astonished to hear higher commanders mention with pride the number of officers or N.C.O.'s who have attended long courses of two or three weeks' duration. For it is usually a confession that they are getting a poor type. Capable men in civil life are likely to be the most capable officers, and the more successful they are in their civil occupation the less likely they are to be able to get away for long courses. Among N.C.O.'s, those who can attend long courses are usually the unemployed. Among officers there are, of course, exceptions. Enthusiasts will often contrive to make time. But even these would prefer courses to be more intensive and suited to their convenience.

For winter training in general, the worst handicap is, however, the system of week-night 'drills'. It upsets every progressive scheme of training when men come on different nights, and only a fraction any night. It would be far better if Sundays could be made the sole and universal days of training outside camp, and week-night parades be abolished except for special courses. Some units are already stretching the regulations to fit this in with the present system of counting drills.

Another needed improvement lies in the better education of officers—through reading. The British Regular officer is not as a class widely read, and hardly as studious as his Continental compeers, but he is certainly better

read than most Territorial or O.T.C. officers. It is questionable whether the Territorial of to-day reads nearly as much as the keen Volunteer of the 'eighties or 'nineties.

One cause is probably the excessive crop of manuals, themselves too voluminous and too often changed. Manuals may serve to remind one of detail—although they would do it better if they were practically simplified and shortened—but they will never help officers to a real understanding of war nor teach them to reason tactically. As a means of education nothing can supersede Napoleon's 'Read and re-read the campaigns of the Great Captains'; and, apart from good lives of the great artists of war, much can be learnt from certain works of fiction. Thirty years' progress in material has not marred the value of Swinton's *Defence of Duffer's Drift*. There are many pearls of wisdom scattered through the entrancing pages of Buchan's *Courts of the Morning*, Britten Austin's *The War God Walks Again*, Montague's *Right Off the Map*. The first part of Newman's *The Cavalry Went Through* is a better stimulus to tactical thought than any manual. All these contain living thought as well as lively reading.

Perhaps this limitation of study and independent thought has influenced the one unfavourable point of contrast between the Territorial Army and the old Volunteer Force. So much more technically proficient than its predecessor, the modern citizen force has made curiously little contribution to military progress, or to military literature. This barrenness breaks the continuity of a great tradition. For, last century, almost all the chief military reforms were inspired and tried out by the Volunteer Force—the simplification of drill; the development of musketry; the introduction of invisible and easy-fitting uniform, of machine guns and cyclists; and, above all, the renaissance of tactical study in the Army. Because of his civil status and the easier fit of his intellectual 'uniform' the keen volunteer officer enjoyed a liberty of thought which made for progress, and enabled

him to help his tightly bound Regular comrades to loosen the collar of obsolete custom. The modern Territorial officer seems too content to be a mass-production replica, turned and planed to correspond as closely as possible to the conventional pattern. Only to signals, and in some degree to artillery progress, has any Territorial soldier contributed. Yet originality is the most vital of all military virtues, as two thousand years of war attest. In peace it is at a discount, for it causes the disturbance of comfortable ways without producing dividends, as in civil life. But in war originality bears a higher premium than it can ever do in a civil profession. For its application can overthrow a nation and change the course of history in the proverbial twinkling of an eye.

PART FOUR

CHAPTER XVI

THE CONCENTRATED ESSENCE OF WAR

This is the shortest chapter—perhaps the shortest in any book on the theory of war. But it has been the longest in production. For it embodies the sum of one's study of war up to date, and attempts to convey this in the simplest form—by crystallizing a few truths that in observation seem so universal, and in analysis so fundamental, as to be termed axioms.

They are practical guides, not abstract principles. Napoleon realized that only the practical is useful when he gave us his maxims.

But the modern tendency has been to search for principles which can each be expressed in a single word—and then need several thousand words to explain them. Even so, these 'principles' are so abstract that they mean different things to different men, and, for any value, depend on the individual's own understanding of war. The longer one continues the search for such omnipotent abstractions, the more do they appear a mirage, neither attainable nor useful—except as an intellectual exercise.

Thus the principles of war, not merely one principle, can be condensed into a single word—'concentration'. But for truth this needs to be amplified as the 'concentration of strength against weakness'. And for any real value it needs to be explained that the concentration of strength against weakness depends on the dispersion of your opponent's strength, which in turn is produced by a distribution of your own that gives the appearance, and partial effect of dispersion. Your dispersion, his dispersion, your con-

centration—such is the sequence, and each is a sequel. True concentration is the fruit of calculated dispersion.

Here we have a fundamental principle whose understanding may prevent the fundamental error (and the most common)—that of giving your opponent freedom and time to concentrate to meet your concentration. But to state the principle is not of much practical aid for execution.

My aforementioned axioms (which are here expressed as maxims) cannot be condensed into a single word, but they can be put in the fewest words necessary to be practical. Eight in all, so far—six are positive and two negative. They apply both to strategy and to tactics, unless otherwise indicated.

DO.

1. *Adjust your end to your means.* In determining your object clear sight and cool calculation should prevail. It is folly 'to bite off more than you can chew', and the beginning of military wisdom is to know what can't be done. So learn to face facts while still preserving faith: there will be ample need for faith—the faith that can achieve the apparently impossible—when action begins. Confidence is like the current in a battery: avoid exhausting it in vain effort—and remember that your own continued confidence will be of no avail if the cells of your battery, the men upon whom you depend, have been run down.
2. *Keep your object always in mind,* while adapting your plan to circumstances. Realize that there are more ways than one of gaining an object, but take heed that every objective should bear on the object. And in considering possible objectives weigh their possibility of attainment with their service to the object if attained—to wander down a side track is bad, but to reach a dead end is worse.

3. *Choose the line (or course) of least expectation.* Try to put yourself in the enemy's shoes, and think what course it is least probable he will foresee or forestall.

4. *Exploit the line of least resistance*—so long as it can lead you to any objective which would contribute to your underlying object. (In tactics this maxim applies to the use of your reserves; and in strategy, to the exploitation of any tactical success.)

These two lines are most likely to coincide if you can:—

5. *Take a line of operation which offers alternative objectives.* For you will thus put your opponent on the horns of a dilemma, which goes far to assure the chance of gaining one objective at least—whichever he guards least—and may enable you to gain one after the other.

   Alternative objectives allow you to keep the opportunity of gaining *an* objective; a single objective, unless the enemy is helplessly inferior, means the certainty that you will not gain it—once the enemy is no longer uncertain as to your aim. There is no more common mistake than to confuse a single line of operation, which is usually wise, with a single objective, which is usually futile. (If this maxim applies mainly to strategy, it should be applied where possible in tactics and does, in effect, form the basis of infiltration tactics.)

6. *Ensure that both plan and dispositions are elastic, or adaptable.* Your plan should foresee and provide for a next step in case of success or failure, or partial success—which is the most common case in war. Your dispositions (or formation) should be such as to allow this exploitation or adaptation in the shortest possible time.

DON'T.

7. *Don't lunge whilst your opponent can parry.* A commander has more resources, and should have more resource than a bayonet-fighter. And in contrast, a body of troops has less power of quick recovery than an individual.

   The experience of history shows that no effective stroke is possible until the enemy's power of resistance or evasion is paralysed. *Hence no commander should launch a real attack upon an enemy in position until he is satisfied that such paralysis has developed.* It is produced by *disorganization*, and its moral equivalent, *demoralization*, of the enemy.

8. *Don't renew an attack along the same line (or in the same form) after it has once failed.* A mere reinforcement of weight is not sufficient change, for it is probable that the enemy also will have strengthened himself in the interval. It is even more probable that his success in repulsing you will have strengthened him morally.

The essential truth underlying these axioms is that, for success, two major problems must be solved—*disorganization* and *exploitation.* One precedes and one follows the actual blow, which in comparison is a simple act. You cannot hit the enemy with effect unless you have first created the opportunity; you cannot make that effect decisive unless you exploit the second opportunity that comes before he can recover.

In conclusion, I will forestall the objection to the third axiom that is foreshadowed by the familiar question—'What will the enemy be doing meantime?' The historical answer is that he will be doing the obvious and assuming that you are doing likewise. The experience revealed in history is sufficiently abundant to justify this hypothesis. Each side tries to frame the plan which appears most

sound; it credits its adversary with similar soundness, and the result is stalemate. Then they attempt further moves on similar calculations—until at last exhaustion or despondency calls 'time' to the struggle.

Occasionally a commander has eschewed the obvious and pursued the unexpected. He has won a decisive success—unless fortune has proved foul. For luck can never be divorced from war, as war is part of life. Hence the unexpected cannot guarantee success. But it guarantees the best chance of it. That is why the successes of history, if not won by exceptionally clever generalship, have been won by generalship that was astoundingly foolish. Perhaps this dual cause explains why Britain has had such a long run of success.

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