might the world's history have been altered had the Russians, possessing command of the air, and locating the actual movements of the Japanese reserves, met flank attack with outflanking movement?

Owing to the fear of moving troops in a wrong direction, and having to counter-march them, there will, I think, be a tendency both in the strategical and tactical stages for commanders to await the reports of their aerial reconnoitrers before deciding what to do. Preliminary orders will be issued and confirmed or altered in accordance with the results of reconnaissances. As the strategical merges into the tactical phase, so the character of the reconnaissance work will be modified. Certain long-distance flights will still be advisable to discover possible flanking and reserve movements, but the greater number will consist of short flights to ascertain the tactical position and place the information *immediately* in the hands of the commander.

But can both sides rely upon obtaining such aerial reports?

So far the results of aerial work have been to do almost entirely with reconnaissance. In future it is perhaps unfair to assume that one side will have aircraft and not the other. How much will be possible while the enemy is also in possession of an aerial squadron? Neither Tripoli nor the Balkans is a guide. The Italians had the air to themselves. The Allies also have been free from interference, except that a good deal of shooting has been done from the ground.

Command of the Air.—General Grierson has told us that war is impossible without command of the air. I am glad that this statement has caused many people to pause and think. But, if I may say so, though I agree with General Grierson with reference to the war of a few years hence, as regards that of to-day I am not quite so certain. I even hold that command of the air can never really be of the same nature as command of the sea. Neither can the same extent of strategical or tactical freedom in the area of operations be obtained, which might result from the vigorous use of good cavalry.

At sea and on land there are only two dimensions. In the air, the third (climbing) is the difficulty. It may, of course, be overcome. We have the precedent of naval evolution from galley to Dreadnought. Weight and speed, the problems of naval designers for centuries, are those of aircraft engineers to-day. The enormous strides which aircraft have made during the last three or four years will, I feel sure, be far greater in the near future.

Nevertheless, I feel that the third dimension is a severe stumbling-block. A fighting machine with its passenger, gun, ammunition, and possibly light armour is a heavy machine. Every attribute is affected. It cannot, for some time, be as fast or easy to handle as an unarmed craft. It will climb more slowly, cause more strain on the pilot, and land with less certainty of remaining whole. The difficulties may be circumvented. Many clever designers are working on the problem of an efficient fighting aeroplane.

It is sometimes argued that, possibly, it is most advisable at present primarily to develop the number of high-speed machines and the training of flyers to handle them. For the time being it would certainly seem that the fast scouting machine will have various advantages over the heavier type, with the result that, if both sides use it, both sides will know a great deal as to what the opponent is doing. If both sides also have fighting machines, the side upon which this fact has the least moral effect will have an important advantage. A little fighting in the air will, I think, have a far-reaching deterrent effect on the moral of the aerial forces of the losing side.

Military aviation is and must be dangerous. Those who take it feel its enormous possibilities for success to their side. They accept its risks. The aircraft of one side will be imbued with greater staying powers, greater determination to fight. This side must be ours. It is this spirit which, creating moral ascendency, always wins on land or sea. It will do so in the air.

Thus, again, as usual, we come to the man, the numbers of him available, his patriotism, self-sacrifice, and training. The indications point, then, to two lines of action being attempted by aircraft in war. The results of reconnaissance work to date demonstrate that each side must attempt not only to gain information, but also to frustrate similar hostile effort. Certain aircraft will be employed purely for scouting purposes, others in fighting off the opposing aeroplanes and airships. The attempt to obtain command of the air will probably take place during the strategical concentration, and before land hostilities have commenced. It is improbable that superiority once gained will be much affected by fresh machines being sent to the front; the moral effect accruing from original physical success in the air will be too great. The side which loses command of the air will labour under all the disadvantages of defensive action.

Effect of aviation on employment of various arms.—There has been much discussion as to the effect of aviation on the employment of the various arms. Infantry is, of course, the arm upon which ultimate success depends. Aviation takes its place with its great auxiliaries. Its alliance is closest with cavalry, and it affects the action of the masses of an army because it influences the uses to which cavalry is put.

Those anxious to reduce expenditure, argue that as aircraft can reconnoitre well, the value of cavalry has ceased to exist. This, I think, is quite unsound. Aircraft will aid and save the cavalry much unnecessary work. Cavalry on its side can help aircraft in many ways. The commander will be fortunate who has the most actively co-operating, highly-organised, equipped, and trained cavalry and air services. An instance of the value of joint action was afforded during the last manœuvres when a patrol discovered the outpost line of a division, and an aeroplane its transport, and thus, though it was not exactly located, the approximate position of the main body.

The value of information is in proportion to the speed with wichh it is handed in. Under reasonable conditions of weather and country, a general can now, within three hours and a half, expect a report as to the approximate strength, formation, and direction of movement of the enemy, if he is within an 80-miles radius. A similar result would take officers' patrols sent out from the strategic cavalry at least three days, while the prospects of acquiring the information would be less. Tactically, the aeroplane is ready to undertake a reconnaissance of, say, three hours' duration, whether to obtain information of the enemy's position and movements, to ascertain the nature of the ground to the front, flanks and rear of a position, and to find suitable targets for the artillery.

It will help in the service of inter-communication, in the co operation of all arms, and also to supplement the telegraph and telephone services in obtaining news of what is happening during a battle.

Moltke's maxim of "March dispersed, fight concentrated," will be aided, a too early deployment and its attendant loss of strength be obviated. The reports of aircraft will afford a degree of security, a saving of officers, men and horseflesh, in anxiety and strain on the commander, in mental wear and tear of the infantry and artillery. A weaker cavalry, better helped by its aircraft, may locate an enemy's cavalry, surprise and fight him on ground best suited to itself, and thus clear the way for the infantry main columns. The cavalry will be available to help the infantry in the decisive battle.

When opposing troops are close together, aircraft will probably be detached to work with units, such as divisions, in order that the information may reach the hands of the subordinate commanders immediately concerned as rapidly as possible.

Lastly, we must always remember the great gain in *moral* which the side with the best air service will obtain. Nevertheless too much reliance must not be placed on aircraft. The impossibility of work in fog, at night and in high winds must be borne in mind. Further the aircraft reconnaissance is essentially a rapid one. It passes and returns, its field of observation is not very detailed. Small bodies of troops will probably quickly learn how best to hide themselves in the nearest cover, such as woods, villages, etc.

Recognising Aircraft.—Both with respect to fighting in the air and to firing at them from the ground the recognising of aircraft is a difficult question. Those who are accustomed to seeing aeroplanes can often tell to which side or country they belong by their type. A reduction of the number of types used will help in this direction. Tables showing types of both friend and foe, as seen from below, will probably have to be issued to staffs and troops taking the field.

In future, possibly, aircraft will tend to develop on nationally characteristic lines in the same way as warships have done, but as yet there is very little guide even in this way. Most British and French aeroplanes are very similar. German ones are, certainly, already somewhat different and more easily recognisable. The colour of machines, except occasionally in certain lights, cannot be distinguished if they are at a height of over 2,000 ft.

These facts render it a matter of great difficulty to arrange a system of umpiring on manœuvres, by means of which an indication may be made as to the advantage gained by one or the other side in the question of air superiority. The naval method whereby two ships speak to each other by wireless and decide any point is obviously impossible. Nor does the system of firing a rocket to indicate to an aircraft that it is out of action, and will not be allowed to continue its work for a time, seem satisfactory. Last year, at all events, our Red and Blue Aircraft had to pass one another, and it is a curious fact worth noticing that, owing to the attention of pilots and observers being concentrated purely upon obtaining information as to the position and movement of the hostile land forces, they seldom even saw each other in the air.

On manœuvres a further condition of unreality is introduced by the fact that aircraft are seldom fired at from the ground. This is probably due to disinclination to shoot owing to difficulty in distinguishing friend from foe, lack of experience in judging heights (experiments with range-taking instruments to determine the heights