Development of Air Power in World War 1

General Hd. Qrs.
17/10/14.
O.B./B.1889.

General Staff, Operation Section
17/10/14.
No. G.A.541.

From,

The Field-Marshal, Commanding-in-Chief,
British Forces in the Field.

To,

The Secretary,
War Office, London, B.W.

———

General Head Quarters,
17th October, 1914.

Sir,

I have the honour to bring to your notice that since the beginning of operations it has been found that the calls on the services of the Royal Flying Corps have materially increased. The necessity for watching the enemy's line for prolonged periods, during which movements of great masses both from reserves and from different parts of the fighting line may take place at a distance of fifty or sixty miles, demands continuous and extended reconnaissance to an unforeseen degree. At the same time tactical aeroplane reconnaissance has proved so valuable that for this purpose and for directing artillery fire it has been found necessary to attach aeroplanes continuously to Army Corps. At the present moment 2 2/3 squadrons out of 5 are detached from Headquarters to Corps. It has also been found necessary to form and now to increase a wireless flight for use with artillery, and there is no doubt that the demands for wireless aeroplanes will also increase.

I consider that, at its present strength, the Royal Flying Corps is just able to meet the demands on it. In the event, however, of any considerable increase in the British Army in the Field, additional squadrons will be required, if reconnaissance on the present scale is to continue. I would therefore urge the necessity of completing in personnel and material the 1st, 7th and 8th Squadrons of the Royal Flying Corps, already authorised, at as early a date as possible, to admit of the additional work being attempted.

Such efficiency as the Royal Flying Corps may have shown in the field is, in my opinion, principally due to the organization and training. It is therefore most desirable that any reinforcements should be organized, trained and equipped in exactly the same manner as the squadrons now in the field.

Owing to the complete divergence between the methods and equipment of the Naval and Military Air Services, I do not consider that units of the Royal Naval Air Service would be suitable as reinforcements to this Force.

I have the honour to be,

Sir,

Your obedient Servant,

(Signed) J.D.P. French, Field-Marshal,
Commander-in-Chief.

Transcribed by RAF CAPS from copy held in The Sykes Papers, RAF Museum Archive, Hendon

G.O.C.

Royal Flying Corps.

The attached is passed for your information.

G.H.Q. (Sd) A.Cavendish, Colonel,
20/11/14. A.A.G. for A.G.

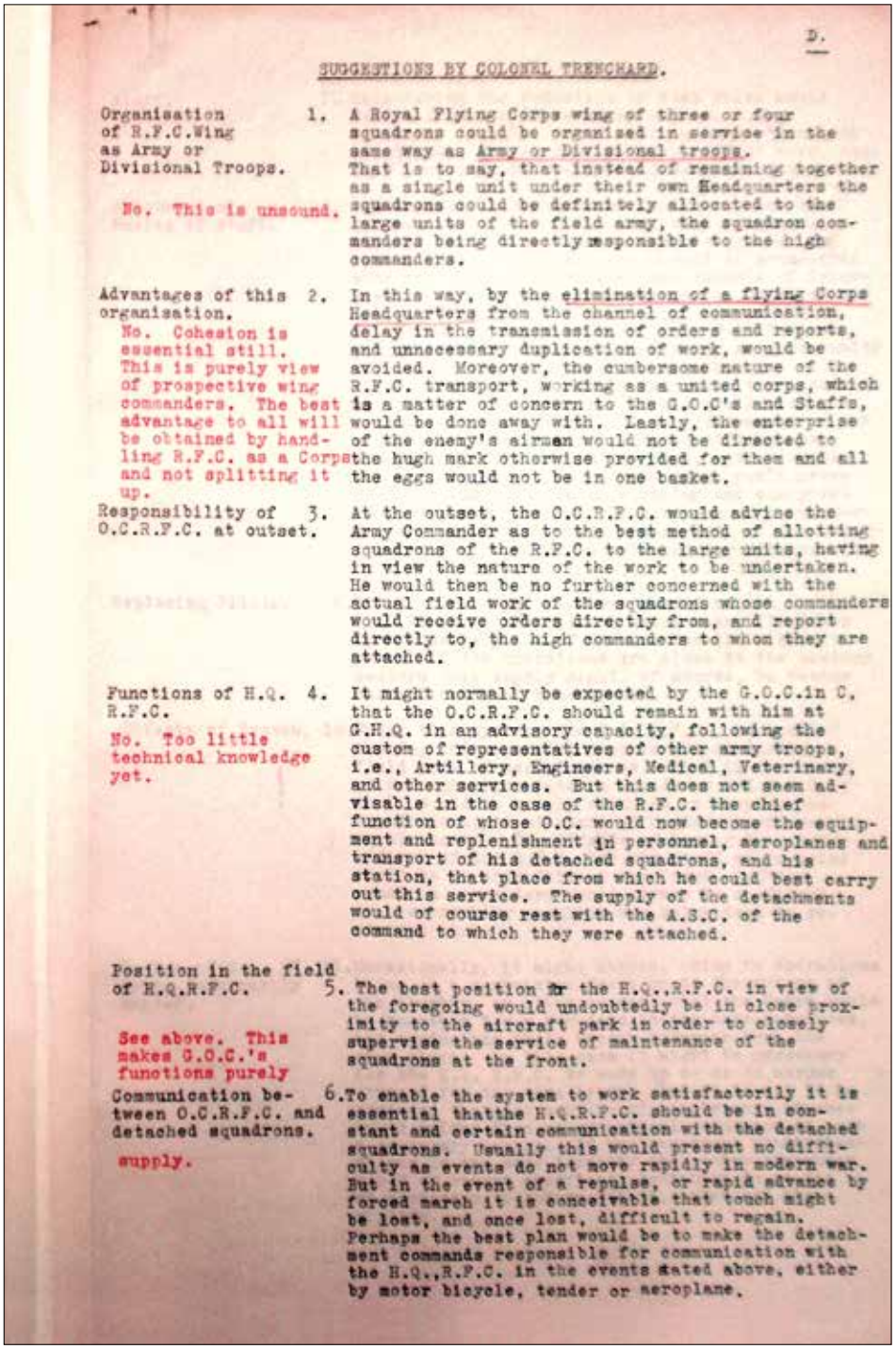
2.

A.G.

I am of opinion that, under present circumstances, the Royal Flying Corps in the field still requires a Commanding Officer. There is much divergence of opinion, coupled with a lack of technical knowledge, in the Army, as to the proper methods of employing aircraft in war, and a central authority is necessary in order to ensure that the best results are obtained with the limited means at our disposal.

21/11/14. (Sd) David Henderson, Maj.-Genl.
Commdg. Royal Flying Corps.

The Henderson Papers, Royal Air Force Museum, Archive, Hendon



D.

SUGGESTIONS BY COLONEL TRENCHARD.

Organisation of R.F.C.Wing as Army or Divisional Troops.

No. This is unsound.

1. A Royal Flying Corps wing of three or four squadrons could be organised in service in the same way as Army or Divisional troops. That is to say, that instead of remaining together as a single unit under their own Headquarters the squadrons could be definitely allocated to the large units of the field army, the squadron commanders being directly responsible to the high commanders.

Advantages of this organisation.

No. Cohesion is essential still. This is purely view of prospective wing commanders. The best advantage to all will be obtained by handling R.F.C. as a Corps and not splitting it up.

2. In this way, by the elimination of a flying Corps Headquarters from the channel of communication, delay in the transmission of orders and reports, and unnecessary duplication of work, would be avoided. Moreover, the cumbersome nature of the R.F.C. transport, working as a united corps, which is a matter of concern to the G.O.C's and Staffs, would be done away with. Lastly, the enterprise of the enemy's airmen would not be directed to the hugh mark otherwise provided for them and all the eggs would not be in one basket.

Responsibility of O.C.R.F.C. at outset.

3. At the outset, the O.C.R.F.C. would advise the Army Commander as to the best method of allotting squadrons of the R.F.C. to the large units, having in view the nature of the work to be undertaken. He would then be no further concerned with the actual field work of the squadrons whose commanders would receive orders directly from, and report directly to, the high commanders to whom they are attached.

Functions of H.Q. R.F.C.

No. Too little technical knowledge yet.

4. It might normally be expected by the G.O.C.in C. that the O.C.R.F.C. should remain with him at G.H.Q. in an advisory capacity, following the custom of representatives of other army troops, i.e., Artillery, Engineers, Medical, Veterinary, and other services. But this does not seem advisable in the case of the R.F.C. the chief function of whose O.C. would now become the equipment and replenishment in personnel, aeroplanes and transport of his detached squadrons, and his station, that place from which he could best carry out this service. The supply of the detachments would of course rest with the A.S.C. of the command to which they were attached.

Position in the field of H.Q.R.F.C.

See above. This makes G.O.C.'s functions purely

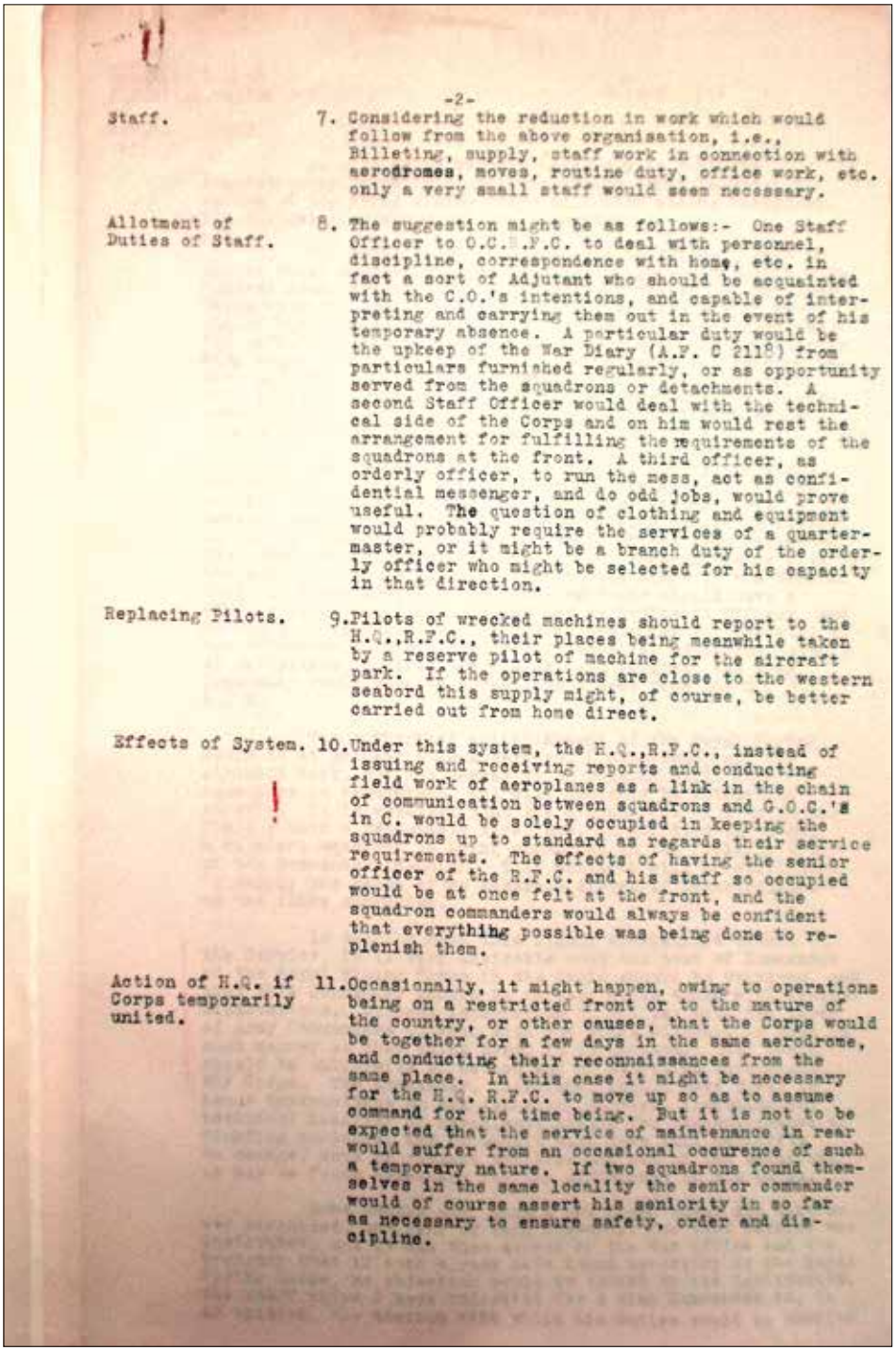
5. The best position for the H.Q.,R.F.C. in view of the foregoing would undoubtedly be in close proximity to the aircraft park in order to closely supervise the service of maintenance of the squadrons at the front.

Communication between O.C.R.F.C. and detached squadrons.

supply.

6. To enable the system to work satisfactorily it is essential thatthe H.Q.R.F.C. should be in constant and certain communication with the detached squadrons. Usually this would present no difficulty as events do not move rapidly in modern war. But in the event of a repulse, or rapid advance by forced march it is conceivable that touch might be lost, and once lost, difficult to regain. Perhaps the best plan would be to make the detachment commands responsible for communication with the H.Q.,R.F.C. in the events stated above, either by motor bicycle, tender or aeroplane.

Trenchard 1914 Red Ink Paper - 1, Royal Air Force Museum, Archive, Hendon



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Staff. 7. Considering the reduction in work which would follow from the above organisation, i.e., Billeting, supply, staff work in connection with aerodromes, moves, routine duty, office work, etc. only a very small staff would seem necessary.

Allotment of Duties of Staff. 8. The suggestion might be as follows:- One Staff Officer to O.C. R.F.C. to deal with personnel, discipline, correspondence with home, etc. in fact a sort of Adjutant who should be acquainted with the C.O.'s intentions, and capable of interpreting and carrying them out in the event of his temporary absence. A particular duty would be the upkeep of the War Diary (A.F. C 2118) from particulars furnished regularly, or as opportunity served from the squadrons or detachments. A second Staff Officer would deal with the technical side of the Corps and on him would rest the arrangement for fulfilling the requirements of the squadrons at the front. A third officer, as orderly officer, to run the mess, act as confidential messenger, and do odd jobs, would prove useful. The question of clothing and equipment would probably require the services of a quartermaster, or it might be a branch duty of the orderly officer who might be selected for his capacity in that direction.

Replacing Pilots. 9. Pilots of wrecked machines should report to the H.Q., R.F.C., their places being meanwhile taken by a reserve pilot of machine for the aircraft park. If the operations are close to the western seabord this supply might, of course, be better carried out from home direct.

Effects of System. 10. Under this system, the H.Q., R.F.C., instead of issuing and receiving reports and conducting field work of aeroplanes as a link in the chain of communication between squadrons and G.O.C.'s in C. would be solely occupied in keeping the squadrons up to standard as regards their service requirements. The effects of having the senior officer of the R.F.C. and his staff so occupied would be at once felt at the front, and the squadron commanders would always be confident that everything possible was being done to replenish them.

Action of H.Q. if Corps temporarily united. 11. Occasionally, it might happen, owing to operations being on a restricted front or to the nature of the country, or other causes, that the Corps would be together for a few days in the same aerodrome, and conducting their reconnaissances from the same place. In this case it might be necessary for the H.Q. R.F.C. to move up so as to assume command for the time being. But it is not to be expected that the service of maintenance in rear would suffer from an occasional occurence of such a temporary nature. If two squadrons found themselves in the same locality the senior commander would of course assert his seniority in so far as necessary to ensure safety, order and discipline.

Trenchard 1914 Red Ink Paper - 2, Royal Air Force Museum, Archive, Hendon

Whole-plate glass negative, Hugh Montague Trenchard, 1st Viscount Trenchard, 1919
Artist (Walter Stoneman),
Credited: © National Portrait Gallery, London

Marshal of the Royal Air Force Sir Hugh Trenchard (later Viscount Trenchard)

By Doctor David Jordan

Born in Taunton on 3 February 1873, Hugh Trenchard began his military career as a probationary subaltern with the Kincardine and Forfar artillery, and before transferring to a regular commission with the Royal Scots Fusiliers. Service in the Boer War was curtailed by an enemy sniper, and there were doubts as to whether he would survive his wound. He not only survived, but regained fitness by becoming a winter sports aficionado, winning a tobogganing championship at the Cresta Run. Service in Nigeria followed from 1903-1910, during which he was awarded the Distinguished Service Order. He fell seriously ill with an abscess on his liver, and was returned to England. Once again, there was a period when there was doubt as to whether he would survive.

Trenchard duly, recovered, but began to fear that his career had reached a dead end. Searching for a new challenge, he was encouraged to join the recently-formed Royal Flying Corps by a friend, Captain Eustace Lorraine, who was serving with the new formation as the adjutant of the Central Flying School. Trenchard ignored protests that he was too old to learn to fly, and soon gained his pilot's certificate. Newly-qualified, he was posted to the Central Flying School to complete his training as a military aviator, but discovered himself in the odd position of acting as both student and adjutant – Lorraine, the man who inspired him to join the RFC, had been killed, and as the most senior available pilot, Trenchard was the logical replacement, even though this strange arrangement saw Trenchard setting and marking his own exams to pass out from the CFS course. Trenchard was then formally appointed as the CFS's Assistant Commandant. He was in command of Military Wing at Farnborough at the outbreak of the First World War, a situation he found uncongenial, as he was anxious to serve in France. Despite agitating to go overseas, he remained at Farnborough until posted to France to command First Wing RFC in March 1915. This placed him in charge of the RFC Wing working for Sir Douglas Haig, marking the start of a strong professional relationship between the two men which endured. When Sir David Henderson decided that he could not both command the RFC in France and act as Director General of Military Aeronautics and returned to London, Trenchard took over GOC RFC in France in August 1915, in the rank of Brigadier-General.

Trenchard commanded the RFC in France until January 1918, and this post saw him overseeing the development of the RFC as a key element in the fighting on the western front – during the course of his tenure, most of the major air power roles and missions familiar today evolved, even if they were known by different terms at this point.

Although doubtful about the wisdom of creating a third service during the middle of a war, and concerned about the effect that the formation of the RAF would have on efficiency, Trenchard's success and reputation as the leading airman of his day led to his appointment as the first Chief of the Air Staff of the Royal Air Force.

He returned to London in early 1918 to oversee the creation of the new service, but resigned shortly before the RAF came into being as the result of a series of disagreements with the Air Minister, Lord Rothermere. He was persuaded to delay his resignation until after the RAF had formed, but it was accepted on 13 April 1918, and he was replaced by Frederick Sykes. This caused a political outcry – in part driven by a member of parliament who was serving in the RAF – and led to Lord Rothermere's resignation less than a fortnight later.

Rothermere's successor, Lord Weir, persuaded Trenchard to take command of the RAF's Independent Force (IF), created specifically to bomb Germany. Trenchard was not convinced about the value of the IF, but as it was the only post on offer to him, he accepted despite his concerns. Although the IF performed to the best of its abilities, Trenchard was moved to record in his diary for 11 November 1918 that the IF had been a waste of resources.

Although Sykes continued as the Chief of the Air Staff, his grand vision for the future of British air power was unaffordable, and the new Secretary of State for War and Air, Winston Churchill, engineered Sykes' translation to control civil aviation and the return of Trenchard to lead the RAF.

Re-appointed Chief of the Air Staff in March 1919, Trenchard set about building the Royal Air Force as a third service, aiming, as he put it to lay foundations which might be either the basis of a great castle or a pleasant little cottage. This saw the creation of the RAF College at Cranwell and the RAF Staff College at Andover, as well as operational developments in the use of air power in colonial policing.

Trenchard's belief in the offensive potential of air power, coupled with the need for a distinct role for the third service also led to the creation of a doctrine which placed strategic bombardment at the heart of the RAF's business, even though the day-to-day, 'bread and butter' work of the air force was to cooperate with the land component on operations in the colonies and mandated territories. Trenchard led the fight to preserve the RAF in the face of a number of attacks by the other two services who feared that it would both deprive them of funding and the sort of air power that they felt they needed; by the time he relinquished the post of CAS in January 1930, Trenchard had placed the RAF on a firm footing as an independent service.

Trenchard moved on from the RAF to serve as Commissioner of the Metropolitan Police from 1931-35. His vision for the Metropolitan Police was not one which the Police Federation shared, and his tenure was regarded as being one notable for considerable upheaval within the force. Nonetheless, his tenure saw the introduction of the Police College at Hendon, although its planned role as the place of education and training for senior leaders rather than basic induction training was not to be realised.

Trenchard remained an influential figure within the RAF. His interventions were not always appreciated by the government, particularly when he intervened over issues such as

disarmament and the defence of Singapore while still serving as police commissioner. He continued to speak as a proponent of air power and the RAF in the House of Lords following his retirement from public office.

In 1940, Churchill offered Trenchard the role of commanding Home Forces, but Trenchard's view of what the job entailed did not match that of the Prime Minister – it was clear that Churchill wished to have a very 'hands on' role himself, prompting Trenchard to decline. He instead spent much of the war visiting RAF stations and units at home and abroad, proving a particularly popular visitor. He also wrote a number of memoranda calling for ever greater efforts in the bombing campaign against Germany. His later years were marked by the onset of blindness, but he remained active in his support of the RAF until his death on 10 February 1956.

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TRAINING MANUAL, ROYAL FLYING CORPS

PART II

(MILITARY WING)

1915

General Staff, War Office

CHAPTER II

THE EMPLOYMENT OF AEROPLANES IN WAR

CHARACTERISTICS AND PRINCIPAL DUTIES OF AEROPLANES

1. Aeroplanes have a radius of action and speed which vary considerably with the type of machine. The average distance which an aeroplane can cover in calm weather is 250 miles, and the average speed is about 70 miles per hour. If properly looked after they may be left in the open for considerable periods without serious deterioration. Different types are constructed and equipped for particular duties, eg, for reconnaissance, artillery observation or offensive action, but although each type is primarily intended for a particular duty, all are able to perform other duties to some extent.

2. The duties of aeroplanes in war may be sub-divided as follows:

(a) Reconnaissance.

(b) Direction and observation of artillery fire.

(c) Fighting against other aircraft.

(d) Destruction of matériel and demolitions at vulnerable points on the enemy's communications.

(e) Offensive action against troops on the ground.

(f) Miscellaneous duties.

3. The most important rôle of aeroplanes in war is reconnaissance. A well-trained and efficient air service will enable a commander to form his plans with a fuller knowledge of the situation than will be possible to one whose air service is inadequate to the task which it has to perform.

4. Aerial reconnaissance, like that carried out by cavalry, may be considered under three heads: strategical, tactical and protective. It differs, however, in the following way from that effected on the ground:

First, it is very rapid. Aeroplanes can maintain a speed of from 50 to 90 miles an hour, and thus obtain in a few hours information that would require several days to obtain by other means.

Second, it is not stopped by natural obstacles such as rivers, or by artificial obstacles in the shape of fortresses.

Third, it can ascertain the movements, position and approximate strengths of the enemy's main bodies instead of the mere contour of his covering troops.

Fourth, it is a comparatively simple matter to bring back the information gained in time for it to be made use of.

5. On the other hand, aeroplanes can accomplish little or nothing in heavy rain, fog, gales or darkness, and although they may be able to fly on any given day, they may not be able to do so at any particular time of day. Further, they may sometimes bring back misleading negative information, they cannot remain in continuous touch with the enemy by day and by night and usually cannot identify individual units.

Hence aviation is a valuable addition to other means of reconnaissance, but does not in any way dispense with the necessity for the latter.

6. Hostile aircraft should, as a rule, be attacked wherever met, in order to prevent the acquisition of information by the enemy, and to gain or retain a moral and material ascendency in the air. Fighting should be avoided only when the pilot has received instructions to the effect that the safe accomplishment of his mission is to be placed before all other considerations, or when he is confident that his reconnaissance has discovered information which it is of paramount importance to his own side to receive without delay.

As in other forms of reconnaissance, information may sometimes have to be fought for, and reconnoitring aeroplanes must always be prepared to do so.

Aeroplanes constructed and equipped with the primary object of fighting in the air will usually be employed to protect those with little offensive power, such as wireless machines. They will also be employed to cut off and destroy hostile reconnoitring aeroplanes, or to attack hostile aeroplanes which are directing artillery fire.

7. The location of targets and the direction of artillery fire is one of the regular functions of aeroplanes, and a proportion are especially equipped for this purpose.

The artillery of a force which is best served by its aircraft will be enabled to gain the ascendancy, more especially in siege warfare, or when the battle has reached a deadlock, and there is little movement on either side. The attainment of this superiority of our artillery will be greatly facilitated if our aircraft have established over those of the enemy an ascendancy so marked that he is unable to use his aeroplanes for the observation of the fire of his guns.

8. Aeroplanes may be employed in the destruction of hostile ammunition and petrol depôts and transport parks. They may also be used to hamper the enemy's operations by the

demolition of road and railway bridges, railway junctions, and detraining stations. Such action may hinder the movement of reinforcements, ammunition, or supplies, either in a limited area in which a tactical decision is being sought, or at such vulnerable points as the enemy's lines of communication, where interruption of traffic, during a critical period of the campaign, may influence the general situation. Owing to the limitations of the carrying power of aircraft, and the consequent necessity of concentration of effort to ensure adequate material results, such enterprises involve the use of a number of aeroplanes.

9. Under certain conditions the moral effect of aircraft against troops on the ground may be very considerable, though the actual effect may be small.

10. Aeroplanes may be employed to watch and report the movements of friendly troops, and thus keep the staffs in closer touch with the progress of events than has been previously possible. The great speed of aeroplanes and the fact of their not being hampered by ordinary obstacles, render them a valuable agent for the conveyance of messages or of staff or other officers. They may also be used for the rapid conveyance of small quantities of ammunition or supplies which may be urgently required at some otherwise inaccessible point.

CO-OPERATION OF AEROPLANES WITH OTHER ARMS

DISTRIBUTION

1. A proportion of aircraft is usually retained to work immediately under General Headquarters in order to locate and watch the movements of the enemy's main reserves, for distant reconnaissance on the flanks and beyond the battle area, and for offensive action against vulnerable points on his lines of communication.

2. Wings of the Royal Flying Corps are attached to armies for the purpose of reconnaissance, observation and direction of fire, and for offensive operations.

3. In order that there may be no duplication of work, a Corps or Divisional Commander, when a detachment is sent to him, should be informed by the Wing Commander of the area of reconnaissance for which the detachment will be responsible. The allotment of aeroplanes for this duty, for observation and direction of Artillery fire, and for offensive operations should be made by the Commander of the detachment. The Commander of the detachment will report at once to the headquarters of the formation to which his squadron or flight is allotted, stating the number of machines he has available, so that they may be used to the best advantage.

CO-OPERATION OF AEROPLANES WITH ARTILLERY

1. It is imperative that close touch be maintained between the Artillery and the Royal Flying Corps unit concerned.

2. During a battle aeroplanes will be detailed to work with certain batteries or groups of batteries, and one or more of the following methods of co-operation will then be adopted:

(a) The observer signals the position of all hostile batteries or other important artillery targets located in the zone allotted to his artillery, and then ranges on each in turn. This method places considerable responsibility on the observer and he should therefore be made fully conversant with the general situation beforehand so as to be in a position to select targets in their relative importance.

(b) An artillery reconnaissance is made by one or more aeroplanes which afterwards land and report to the Commander of the artillery, and then ranges on each in turn. This officer then allots targets and aeroplanes to the units under his command, and observation of fire is carried out in the usual way.

(c) If the artillery Commander and his units are supplied with wireless receiving sets, the positions of targets as signalled by an observer may be taken by all wireless stations using the same prefix. The artillery Commander may then detail units to engage specified targets. The observer watches the results of fire, calls up the battery whose fire needs correcting, by the general prefix followed by the index number of the target, and proceeds to correct.

3. The observer should signal to the artillery Commander when he has to return to the landing ground so that no time may be lost in sending out another machine.

4. During an advance the infantry and advanced artillery posts may keep in touch with aeroplanes by means of electric signalling lamps. If the further advance of infantry is hindered by an obstacle, such as a fortified house, the artillery Commander may signal an aeroplane to direct the fire of a specified battery on to the obstacle. In such circumstances no other battery should fire lyddite shell on the area in which the obstacle is situated, while ranging is taking place.

5. If an observer locates a particularly favourable target such as a hostile force halted in mass, or on the march, he may indicate its position by firing smoke signals when vertically over the target. He will continue to fire these signals at intervals until fire is opened. The movements of a target may also be indicated in this way and the stop signal used when it appears desirable to stop the fire. Certain batteries should be detailed to watch for these signals and to act on them without delay. These signals will not be required by wireless machines already in touch with batteries. Such machines will signal the position of the hostile body followed by the signal "fleeting opportunity".

These signals should only be used by specially authorized observers.

6. Aeroplanes may be detailed to work with the artillery of the advanced guard when contact with the enemy is about to occur. Observers will then signal the positions of the enemy's batteries, &c, direct to the artillery commander of the advanced guard. They may be required to range the artillery on these targets or to report generally on the effect of fire. When necessary aeroplanes will show that they wish to signal information by making a complete circle over the advanced guard artillery. As a general rule, when the force is deployed, the approximate positions batteries are to occupy, and the zones they are to engage, should be stated to observers before they leave the ground. But information as to the positions batteries will occupy is not essential when observers are in touch by wireless, and can receive messages by lamp from the artillery commander.

OFFENSIVE ACTION

1. Every effort must be made to attain superiority in the air as early as possible. The importance of aerial reconnaissance and the observation of artillery fire by aeroplanes is so great that each side will strive to prevent the other making use of them.

2. The main types of offensive action by aeroplanes are:

(a) Attack of aircraft.

(b) Destruction of material.

(c) Attack of troops.

(a) *Attack of Aircraft*. Hostile aircraft should be attacked wherever met, unless for such reasons as the distance to be traversed, or the importance of the information already gained, the observer should consider it undesirable to engage.

The means for fighting in the air are:

(i) The use of firearms.

(ii) Dropping steel darts or some apparatus designed to injure the hostile machine.

(iii) Throwing or dropping incendiary or explosive bombs.

Skill in piloting and the use of high speed aeroplanes are of great value in this work, but weapons of offense, preferably firearms affording volume and accuracy of fire, are necessary to give them effect.

The relative volume of fire can be increased by;

(1) The use of more efficient weapons;

(2) Concentrating the fire of two aeroplanes upon one of the enemy;

(3) Manoeuvring for position so as to obtain the most effective use of one's own weapons, while denying the use of his to the enemy.

3. Accuracy of fire may be increased by manoeuvring, but is also largely dependent on the training of the gunner.

Fire arms are selected for their suitability for types of aeroplanes. In many aeroplanes a machine-gun can be used with great effect, a rifle or carbine is better adapted to others, and in some, such as single-seater scouts, automatic pistols are all that can be readily used.

Rifles and pistols should be loaded before starting and placed where they can be readily used.

A rifle-calibre machine gun capable of delivering a rapid rate of fire for periods of two or three minutes is the most generally suitable arm.

The gun mounting must allow the largest possible area of traverse, elevation and depression. Large arcs are difficult to obtain in tractor aeroplanes, and even in those of a propeller type it is necessary to move the gun bodily in order to enable the gunner to see over the sights.

4. The following table gives the best positions for firing from various types of aeroplanes, and the best positions for our aeroplanes in air fighting:

	BEs & Avros	Parasols: Moranes & Bleriots	Propeller Machines
Best direction to fire	Backwards, upwards, slightly to one side	Backwards and upwards	To the front and slightly upwards
Best position of our aeroplanes with reference to that of the enemy	In front and at a lower altitude	In front	Behind and below
Best relative position of two aeroplanes working as a pair	Side by side at same altitude		

5. The pilot should also:

(a) When chasing, aim to keep the enemy in view, and himself out of view.

(b) Endeavour to keep his aeroplane between the enemy and the sun, and the enemy on his gunner's left hand.

(c) Avoid placing himself on the left of the enemy (unless it puts the sun in the enemy's eyes), and not fly immediately above or below him.

(d) If a turn is necessary turn towards the enemy, not away from him. By turning away the enemy may be lost sight of and given an opportunity to follow.

The observer gunner must:

(1) Carry glasses to identify aircraft.

(2) Note the relative speeds of the aeroplanes and, if with the advantage, hold fire until a favourable opportunity is gained.

(3) Not fire at long range unless it is obvious that no further chance will be afforded.

(4) Aim well in front for crossing shots, allowing (as a rough guide) 1½ lengths per 100 yards.

6. To fight a successful action in the air a mutual understanding must exist between the pilot and the observer-gunner, more especially in fighting from a machine, from which the observer fires to the rear as the pilot cannot keep the enemy's aeroplane in view. This undertaking is only gained by experience and practice. Observers should frequently practice handling firearms in the aeroplane and firing from it.

(b) *Destruction of Matériel.*

1. The destruction of matériel, and especially the despatch of expeditions against any particular target, should not be undertaken without reference to Royal Flying Corps Headquarters, in order that the latest information as to the value of the target may be obtained, and to ensure that it is worth the risk incurred.

2. The objectives may be local targets, such as are offered by the enemy during his daily operations, eg, ammunition or transport parks, aerodromes, observation balloons, &c, or his means of communication and sources of supply, eg, railway trains, stations, petrol depôts, bridges, power stations, water and gasworks, &c.

3. In order that a sufficient weight of bombs may be carried to render such attacks really effective, observers are not generally taken, but they may be required to carry out the reconnaissance of the objectives selected for attack, and should always note and report suitable objectives. These should be photographed by the aerial reconnaissance so that the pilots of the attacking machines may be provided with pictures showing the appearance of the objective as seen from the air.

(c) *Attack of Troops.*

1. The attack of troops on the ground may be undertaken at the discretion of the pilot, provided always that sufficient care is exercised in avoiding the attack of localities where any considerable injury is likely to be inflicted on peaceful inhabitants.

2. The weapons which may be employed are:

(i) Machine guns.

(ii) Steel arrows.

(iii) Shrapnel or melinite bombs.

3. The weight which can be carried in addition to the observer is small, and consequently the loss inflicted on the enemy will be less than if the pilot undertakes the attack alone with a full load of bombs; but it may sometimes be advantageous to carry out this form of attack in conjunction with reconnaissance.

4. The best results may be expected to be obtained during a pursuit when the moral effect is greatest, and when troops crowded on roads or at defiles offer good targets. Observers should note and report suitable opportunities for this form of attack.

ACTION OF AEROPLANES WHEN FIRED AT BY ANTI-AIRCRAFT GUNS

1. When fired at by anti-aircraft guns an aeroplane can:

(a) Change its altitude, viz, dive 100 feet or more.

(b) Change its direction sharply.

(c) Combine (a) and (b).

2. If the previous course is persisted in, changes of altitude offer little or no difficulty to the guns, as they are allowed for and corrected instantly by the sights. Sharp changes of direction, however, completely upset the prediction and cause all the shell already fired to be wasted. It is a question entirely of flight of shell. At a range of 5,000 yards the shell takes, approximately, 15 seconds to arrive. When firing it is, therefore, necessary to give sufficient deflection to the gun so that the shell shall meet the path of the aeroplane in 15 seconds time. If the aeroplane turns at right angles to its path, all the shells then in the air (about eight) are wasted and a new prediction has to be made which can be as easily upset by repeating the manoeuvre before another 15 seconds elapse.

3. A change of altitude combined with a change of direction is so slight an improvement on change of direction alone, that it is probably not worth losing altitude for.

4. The position of the sun with regard to the aeroplane has an important bearing on the difficulty of recognising aeroplanes and observing the fire of anti-aircraft guns.

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PAPER ON FUTURE POLICY IN THE AIR

22ND SEPTEMBER 1916

FUTURE POLICY IN THE AIR

Since the beginning of the recent operations the fighting in the air has taken place over the enemy's line, and visits of hostile aeroplanes over our lines have been rare. It is to be hoped that this state of things may continue, but as one can never be certain of anything in war, it is perhaps an opportune moment to consider what policy should be adopted were this state of affairs to change, and were the enemy to become more enterprising and more aggressive.

It is sometimes argued that our aeroplanes should be able to prevent hostile aeroplanes from crossing the line, and this idea leads to a demand for defensive measures and a defensive policy. Now is the time to consider whether such a policy would be possible, desirable and successful.

It is the deliberate opinion of all those most competent to judge that this is not the case, and that an aeroplane is an offensive and not a defensive weapon. Owing to the unlimited space in the air, the difficulty one machine has in seeing another, the accidents of wind and cloud, it is impossible for aeroplanes, however skilful and vigilant their pilots, however powerful their engines, however mobile their machines, and however numerous their formations, to prevent hostile aircraft from crossing the line if they have the initiative and determination to do so.

The aeroplane is not a defence against the aeroplane but it is the opinion of those most competent to judge that the aeroplane, as a weapon of attack, cannot be too highly estimated.

A signal instance of this fact is offered to us by the operations which took place in the air at Verdun.

When the operations at Verdun began, the French had few machines on the spot. A rapid concentration was made, and a vigorous offensive policy was adopted. The result was that superiority in the air was obtained immediately, and the machines detailed for artillery co-operation and photography were enabled to carry out their work unmolested, but as new units were put into the line which had less experience of working with aeroplanes, a demand arose in some quarters for machines of protection, and these demands were for a time complied with. The result was that the enemy took the offensive, and the French machines were unable to prevent the hostile raids which the enemy, no longer being attacked, was now able to make. The mistake was at once realised and promptly rectified. A policy of general offensive was once more resumed, and the enemy at once ceased to make hostile raids, all his time being taken up in fighting the machines which were attacking him. Superiority in the air was thus once more regained.

On the British front, during the operations which began with the battle of the Somme, we know that, although the enemy has concentrated the greater part of his available forces in the

air on this front, the work actually accomplished by their aeroplanes stands, compared with the work done by us, in the proportion of about 4 to 100. From the accounts of prisoners, we gather that the enemy's aeroplanes have received orders not to cross the lines over the French or British front unless the day is cloudy and a surprise attack can be made, presumably in order to avoid unnecessary casualties. On the other hand, British aviation has been guided by a policy of relentless and incessant offensive. Our machines have continually attacked the enemy on his side of the line, bombed his aerodromes, besides carrying out attacks on places of importance far behind the lines. It would seem probable that this has had the effect so far on the enemy of compelling him to keep back or to detail portions of his forces in the air for defensive purposes.

When Lille station was attacked from the air for the first time no hostile aeroplanes were encountered. The second time this place was attacked our machines encountered a squadron of Fokkers which were there for defensive purposes. This is only one instance among many.

The question which arises is this: Supposing the enemy, under the influence of some drastic reformer or some energetic leader, were now to change his policy and follow the example of the English and the French, and were to cease using his aeroplanes as a weapon of defence and to start a vigorous offensive and attack as many places as far behind our lines as he could, what would be the sound policy to follow in such a case? Should we abandon our offensive, bring back our squadrons behind the line to defend places like Boulogne, St Omer, Amiens and Abbeville, and protect our artillery and photographic machines with defensive escorts, or should we continue our offensive more vigorously than before? Up to now the work done by the Germans compared with that done by our aeroplanes stands, as we have seen, in the proportion of 4 to 100, but let us suppose that the enemy initiated a partial offensive in the air, and that his work increased, compared with ours, to a proportion of 30 or 50 to 100, it is then quite certain that a demand for protective measures would arise for protective squadrons and machines for defensive patrols.

One of the causes of such demands is the moral effect produced by a hostile aeroplane, which is out of all proportion to the damage which it can inflict.

The mere presence of a hostile machine in the air inspires those on the ground with exaggerated forebodings with regard to what the machine is capable of doing. For instance, at one time on one part of the front whenever a hostile machine, or what was thought to be a hostile machine, was reported, whistles were blown and men hid in the trenches. In such cases the machines were at far too great a height to observe the presence of men on the ground at all, and even if the presence of men was observed it would not lead to a catastrophe. Again, a machine which was reported in one place would certainly, since it was flying rapidly, be shortly afterwards observed in another part of the lines and reported again, but the result of these reports was often that for every time the machine was sighted a separate machine was reported, leading at the end of the day to a magnified and exaggerated total.

The second policy, then, which should guide all warfare in the air would seem to be this: to exploit this moral effect of the aeroplane on the enemy, but not to let him exploit it on ourselves. Now this can only be done by attacking and by continuing to attack.

It has been our experience in the past that at a time when the Germans were doing only half the work done by our machines that their mere presence over our lines produced an insistant and continuous demand for protective and defensive measures.

If the Germans were once more to increase the degree of their activity even up to what constitutes half the degree of our activity, it is certain that such demands would be made again.

On the other hand, it is equally certain that, were such measures to be adopted, they would prove ineffectual. As long as a battle is being fought any machine at the front has five times the value that the same machine would have far behind the lines.

If the enemy were aware of the presence of a defensive force in one particular spot he would leave that spot alone and attack another, and we should not have enough machines to protect all the places which could possibly be attacked behind our lines, and at the same time continue the indispensable work on the front.

But supposing we had enough machines both for offensive and for defensive purposes. Supposing we had an unlimited number of machines for defensive purposes, it would still be impossible to prevent hostile machines from crossing the line if they were determined to do so, simply because the sky is too large to defend. At sea a number of destroyers will have difficulty in preventing a hostile destroyer, and still less a hostile submarine, from breaking the blockade. But in the air the difficulty of defence is still greater, because the area of possible escape is practically unlimited, and because the aeroplane is fighting in three dimensions.

The sound policy would seem to be that if the enemy changes his tactics and pursues a more vigorous offensive, to increase our offensive, to go further afield, and to force the enemy to do what he would gladly have us do now. If, on the other hand, we were to adopt a purely defensive policy, or a partially offensive policy, we should be doing what the French have learnt by experience to be a failure, and what the rank and file of the enemy, by their own accounts, point to as being one of the main causes of their recent reverses.

Moreover, in adopting such a policy it appears probable that the Germans are guided by necessity rather than by choice, owing to the many fronts on which they now have to fight, and owing also to the quality and the quantity of machines they have to face on the Western front alone. Nevertheless, one cannot repeat too often that in war nothing is certain, and that the Germans may, either owing to the pressure of public opinion, or the construction of new types of machines, or the rise of a new leader, change their policy at any moment for a more aggressive one.

Advanced Headquarters,
Royal Flying Corps,
September 22nd, 1916.

Transcribed by RAF CAPS from copy held at RAF Air Historical Branch, AHB 5/230.

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Printed for the use of the Cabinet. April 1916.

CONFIDENTIAL[1]

AIR SERVICE IN THE WAR (II)

This paper is supplementary to that which I wrote and circulated to the Cabinet on the same subject on the 16th February.

Since then the Co-ordination Committee, which was appointed to adjust relations between the War Office and the Admiralty, in respect of supplies for the Air Service, has broken down. Its chairman, Lord Derby, and its independent advisory member, Lord Montagu of Beaulieu, have both resigned; and there can hardly be any question of setting it up again in anything like the same form. A new chairman and a new advisory member would be merely the prelude to a renewed disaster.

The reasons for which the Committee has failed have been stated with candour both by Lords Derby and Montagu in their letters of resignation to the Prime Minister, and, more especially by the latter, in public speech. They are such as were clearly anticipated and exactly foretold by those who objected to the appointment of the Committee at the start, and were indeed inherent in its composition and powers.

The composition of the Committee, which was regarded as a Sub-Committee of the War Committee, was as follows: Lord Derby; three representatives of the Admiralty, namely, Admiral Vaughan Lee, Commodore Sueter, and Commander Briggs; two representatives of the War Office, General Sir D Henderson, and Colonel Ellington; and Lord Montagu. Sir M Hankey and Colonel Storr, of the Imperial Defence Committee, acted as secretaries.

Broadly speaking, its functions were described in the terms of reference as being "to collaborate in and co-ordinate the question of supplies and design for *materiél* for the naval and military air services".

Two features in its composition may at once be noticed:

1. Though described as a Sub-Committee of the War Committee, not a single one of its members was a member of the War Committee, nor was its chairman a member of the Cabinet. He was not, therefore, in a position to exercise real authority.

2. While the first War Office representative, Sir D Henderson, was a member of the Army Council, and could therefore speak for the War Office as a plenipotentiary, the leading

[1] Editor's note: The original protective marking is reproduced for completeness although this document is now UNCLASSIFIED.

> Admiralty representative was not a member of the Board of Admiralty, and had no authority … tribution to the Committee, and, as a consequence, the Committee itself, was sterilised from the start.

Lord Derby's reasons for resigning, as stated by him, were as follows:

> 1. The Committee had no executive power and no authority. (Lord Montagu used the same language).
>
> 2. A fundamental disagreement was found to exist between the two branches of the service, each having its own organisation, *esprit de corps*, and aspirations.
>
> 3. The terms of reference were so narrowly limited as to preclude the Committee from deciding any question of policy. The Secretary has stated that the Admiralty representatives invariably took the line that the Committee had nothing to do with policy. A broader view was taken by Sir M Hankey himself, who thinks that it would have been in the power of the Committee, after ascertaining the views of both Departments, to submit a co-ordinated scheme. But I confess that I do not so read the terms of reference; and in my view Lord Derby was right in accepting the Admiralty view of the exceedingly restricted nature of his own and his colleagues' functions.

Lord Derby further went on to say that he found no existing division of duties between the Naval and Military Air Services, and no general principles upon which co-ordination was possible. Without such a policy, he said, it was impossible to allocate orders.

To these reasons Lord Montagu added that no decision could be arrived at by the Committee unless all its members were unanimous, and that no recommendation could be made unless the representatives of the Admiralty and War Office agreed.

The powerlessness of the Committee was sufficiently demonstrated when they came to discuss an admirable Interim Report, drawn up, after five sittings, by Sir M Hankey. Upon this they found it impossible to agree; and the aforesaid resignations followed.

It has been important to summarise the reasons of the failure in order to avoid the danger of reproducing, by similar causes, the same result. So far as I can judge from independent evidence, the underlying cause lay in the more rigid conception of its prerogatives entertained by the Admiralty than by the War Office, and its reluctance to admit of any interference with or diminution of the present autonomy. An agreement could not even be arrived at on such questions as by which of the two Air Services long-distance raids should be carried out, and whether it was necessary for the Admiralty to continue to construct aeroplanes, or seaplanes and airships only.

At the same time, if I may judge from the draft Interim Report, the Committee would appear to have done some extremely useful and valuable work, both in investigation and in co-ordination, which should be of great assistance to any who may succeed them, and to have appreciably advanced the solution of some of the very complicated problems connected with the present position of the Air Service.

There now remains the question by what kind of organisation the defunct Committee ought to be replaced, not so much to satisfy public opinion (although I believe this to be keenly aroused) as to advance the settlement of the air problem in relation to success in the present war, and to the creation of a sound air policy thereafter.

For the reasons already given I have dismissed the idea of reviving the Committee in anything approaching its present form.

Equally do I dismiss the idea of reverting to the *status quo ante*. I believe that neither Parliament not the public would acquiesce in any such decision. I have had many opportunities of ascertaining what is the opinion, not of ignorant or prejudiced outsiders, but of responsible authorities and experts on the matter. I have not found a single person outside the two offices (and I doubt if there are many there) who is content with the present situation. I pay no attention to the newspaper articles on the subject, which I have seldom read. But it is from the mouths of those who know, and have fought and seen, that I have repeatedly heard the following charges or admissions, which if collectively at all true will account for the widespread desire for a radical change. Owing to the great mistake of 1912, we have as yet no lighter-than-air ships to act as the eyes of our fleet, or to fight the Germans with their own weapons. How much our naval reconnaissance suffers in consequence the authorities know full well. After nearly twenty-one months of war our fighting planes are outclassed by German machines, and for the time we have ceased to hold the mastery of the air. Though we are now turning out some splendid new machines, we are still working at the front with a majority of old types, and our men are liable to be outclassed and outpaced by the enemy. For the first year of the war we were, I believe, solely dependent on French engines; and though we are now doing better as regards home supply, we still have to rely in the main on French engines – the Gnome, Renault, Salmson, de Rhone, and Clerget. We have not as yet been able to provide ourselves with a fleet of high-flying and powerful aeroplanes capable of attacking and destroying Zeppelins in this country. The methods of defence adopted against these invaders have not hitherto been attended with great success, and have resulted in sad loss of life to our own aviators.

As regards the relations between the two branches of the service, so imperfect has been the co-ordination that, not merely are designs competed for and machines ordered, but operations have sometimes been undertaken, without any intercommunication. Each service still claims the right to conduct long-range offensive operations, and therefore to acquire the high-power engines for the purpose. The evidence is incontestable that there has been a

great lack of co-operation, and a competition, often the reverse of advantageous, between the two services.

To these I might add the grave mistakes – for which the present Board of Admiralty has no responsibility – which resulted in 1914 in making the Admiralty accountable for the aerial defence both of London and the United Kingdom (except, I believe, the arsenals and factories); in the order of 1,100 Curtis machines in the United States at a cost of 1,750,000l, only a third of which were fortunately supplied, while these turned out to be useless as war airplanes and could only be used for school work; and in the costly extravagance of the armoured cars and land Dreadnoughts, on the former of which over 1,000,000l of the public money was wasted.

The sum of these allegations, whether or not they can be justified in every particular, explain why it is that so strong a demand has arisen for a broader and more far-seeing policy and for a more authoritative control, and why it is impossible to revert to the *status quo ante*.

If this conclusion be accepted, what are the alternatives that now remain open to us? They may be classified under the headings – (A) Further Investigation; (B) Immediate Action.

(A) (1) The Government may hold that even now it is not fully or correctly seized of the position, and that further enquiry is needed before a definite solution is sought. For this purpose it would of course be possible to appoint an independent Committee – for the most part outside of the Government – who might be composed of or take the evidence of the experts and others, with instructions to produce a scheme. Personally, I think that this would be the worst of all courses, because (1) it would involve an abnegation of the responsibility of Government; (2) the experts, I am told, are by no means in agreement, and profoundly mistrust each other; (3) there is no guarantee that the resultant scheme would be one that the Government would be in the least inclined to accept. If that were so, valuable time would have been wasted, and the public would say that it had been tricked.

(2) There is a variant of this idea for which more might be said. It is that the Prime Minister should appoint a small Cabinet Committee, under one of his colleagues, to hear the various parties, the War Office, the Admiralty, the aviators, and, if necessary the malcontents, and to furnish a scheme. My own impression is that while this might have been a possible or even desirable course six or even three months ago, it is now too late. The cry would be raised "Another Committee", and "a further postpone-ment of decision". Neither am I clear, from the attitude of the two parties on Lord Derby's Committee, that any substantial progress would be made. Each office or each service would repeat its formulæ or its pretentions, and when the Committee had listened to them, made up its own mind, and reported, the controversy would have to begin all over again either in the War Committee or in the Cabinet, to whichever body the matter was finally referred.

> Moreover, I do not see how such a Committee could report, even if it sat every day – for which it is well-nigh impossible in existing circumstances to find the time – in less than three weeks or a month, so that the final decision would be even longer delayed.

Other forms of enquiry may be suggested. But I will not pursue them here, because it is not in that direction that the solution is at all likely, in my judgement, to be found.

I turn, therefore, to the heading of "Action":

(B) (i) Lord Derby in his letter of resignation, while not mentioning the word Air Ministry, held that the two services ought to be, and ultimately must be, amalgamated (though he recognised the extreme difficulty of doing this in war time). Even now he considered it essential that they should be housed in the same building, with, if possible, a Joint Designating Branch and a Joint Central Branch; and he stated that, while the military representatives on his Committee were ready to assent to this proposition, the naval authorities were not agreed, and the Board of Admiralty objected decidedly to the removal of the Air Branch from their building.

Lord Montagu, in his speech at Birmingham, argued without qualification for an Air Ministry with full power and responsibility; and he has since circulated to the Cabinet a memorandum containing a concise and definite plan for that object.

Sir M Hankey, in his Draft Report, asked the Committee to say that, while "perceiving considerable difficulties and many objections in the way of the immediate formation of a separate National Air Service, they consider that their deliberations must be conducted in the light of a possible eventual consummation of this ideal". Such a National Air Service (which would, of course, involve an Air Department or Ministry) would, he added, involve, as its natural sequel, the construction of a national air factory.

Such are the recorded opinions of members of the Committee. Outside the Committee there is scarcely a dissentient voice among those who are qualified to speak, or have taken a prominent part in speaking, that an Air Ministry is the sole and inevitable solution. Here, again, I except the two Departments, in which opinion differs, or, at least, is less unanimous; and it may candidly be admitted that many of the speakers who advocate such a Ministry are probably insufficiently acquainted with the departmental difficulties involved. Whether these are insuperable now and in war time it is difficult to say without closer examination. That they will eventually have to be overcome cannot be doubted.

A variety of schemes for the creation of such a Ministry and department have been circulated and made public. They all agree in one respect, viz, in demanding a Cabinet Minister as chairman – a demand which, it is probable, proceeds less from confidence in the existing administration than from the conviction that, without an authority of Cabinet rank in the chair, such a department could neither frame nor carry out a policy, nor hold its own with the War Office, Admiralty, and Treasury.

Mr Pemberton Billing, MP, has published a scheme in which the Air Minister would preside over a Board consisting of a number of Directors, of Operations, Air Defences, Construction, Personnel, Equipment, with one member representing the Army and another the Navy. There would also be a Parliamentary Secretary, a Financial Secretary, and a Permanent Secretary, and, indeed, a departmental organisation on a large and independent scale.

Lord Montagu's scheme is more modest. The President, in this case, would be assisted by a Consultative Board, consisting of Vice-President (or Parliamentary Secretary), Chief of Naval Aviation, Chief of Military Aviation, Chief of Anti-Aircraft Corps, and Director of Research. Under the Board would be a number of departments.

I need not here analyse other schemes which I have seen.

All these plans involve, or appear to involve, proceedings closely analogous to those which were adopted when the Ministry of Munitions was set up, ie Parliamentary legislation, the official appointment of a representative in one or both Houses of Parliament, the creation of a full departmental staff or secretariat, the removal from both the War Office and the Admiralty buildings of the staff of the two services, the amalgamation of those services, their housing in a single building, complete control of Construction and Supply, the appointment of a Financial Secretary or Adviser, and some considerable measure of financial independence.

No scheme that I have seen proposes to take away from the supreme Naval and Military Commanders (eg, Sir J Jellicoe, Sir D Haig, Lord French) the complete control of the aircraft placed at their disposal. The Board or Ministry would formulate a policy in consultation with its naval and military advisers. Its execution would be left to the several commanders.

I do not anticipate that, in the present state of public opinion, any great Parliamentary difficulty would be encountered in passing the necessary legislation; for, with scarcely an exception, the principle of such a department was not merely endorsed, but enthusiastically urged, by every speaker in the recent debates in both Houses of Parliament.

The objections that may be raised to it appear to be the following:

1. It would be disliked, and perhaps resisted by the Admiralty.

2. It would be a concession to public agitation – an argument that is of little value if either the public agitation has been right, or the result would conduce to the more vigorous prosecution and the speedier termination of the war.

3. It may be said that it would produce an amount of friction and disorganisation that would be ill-compensated by the increase in efficiency, if there were such an increase, that would be obtained. The answer is, of course, that this would depend upon the degree of friendliness with which the two great departments would regard the changes. They might make the life of such a department a purgatory, perhaps worse. On the other hand, with tact and goodwill, it might sail with a fair wind.

4. It is too late in the course of the war to attempt it – a plea which rests on the uncertain and wholly obscure factor of what the duration of the war may be, and which is to some extent discounted by the consideration that even were the war to cease in six months, an organisation for air service ought in all probability to survive.

On the other hand, quite apart from those who wholeheartedly support the scheme, and regard it as a vital element in national success, I have found many, who, while not enamoured of the idea, or even distrusting it, would sooner make the plunge now, than continue taking off and putting on our clothes on the bank, and who think that, doubtful as the experiment may be, it is at least better than any further attempt at makeshift or compromise. Better, they say, take the entire forces away from Admiralty and War Office and assume the full responsibility, than continue to nibble at the authority of either or both, and attempt an interference which will probably be ineffective and certainly irritating.

I have no idea what view the Prime Minister or the Cabinet may take of these considerations. But in the event of their being equally unwilling either to take the extreme step or to do nothing, I have considered whether any other course would be possible. With much diffidence I submit, before concluding, the following outlines of yet another alternative. I would not like to be too sharply challenged about every particular, because, unlike the majority of my colleagues, I have no department behind me to assist me in the preparation of schemes, and am dealing with a subject in which I am necessarily an amateur. I have, however, at the Prime Minister's insistence, had conversations with the principal parties concerned.

(ii) An Air Board might be constituted on the conceivably following lines:

(a) The Board might be comprised thus:

President, who should be a Cabinet Minister.
Military representative (who would naturally be Sir D Henderson, now a member of the Army Council).
Naval Representative (who must be a member of the Board of Admiralty – if not an existing member, then one who would be added to it for the purpose – otherwise he could not speak for the Admiralty, and would only have power to refer, or, in other words, to defer).
An officer possessing personal experience of aircraft and aviation and aviation in war (but not an inventor or pilot).
One or two independent persons with mechanical engineering or general administrative experience.

(b) The Board should be an advisory Board in relation to its President, ie, matters should not necessarily be decided by voting strength.

(c) The Board should be appointed by the Government on the distinct and avowed understanding that its duty is, firstly, to formulate a policy; and, secondly, in the light of the experience which it would presently acquire, to advise the Government, before any long time has elapsed, for or against the creation of an Air Ministry, and, if the former, then to draw up a scheme. It might find the obstacles insuperable, or it might in due time present a thought-out and acceptable plan. In either case it would act after personal experience.

(d) If the question be asked what "formulating a policy" means, I would give several illustrations in reply. The duty of the Board, after considering the respective cases of the Army and the Navy, already placed before Lord Derby's Committee, would be to determine their respective spheres of operation; to decide (of course in consultation with them) when they should co-operate and when they should act independently; to prevent competition in the production and purchase of aircraft, and equally in the employment of men and machines; to settle the vexed question of long-range operations, at present the source of so much dispute, duplication, and waste; to co-ordinate the demands of Home Defence and Foreign Aggression; to frame a comprehensive policy (if it does not already exist) for Home Defence; to co-ordinate sea-patrol with land attacks.

(e) In the event of the War Office or Admiralty representative disagreeing with any proposed act or pronouncement of the Board or its chief and persuading the Army Council or the Board of Admiralty of the justice of his views, reference should then be made to the War Committee, which should be the sole Court of Appeal.

(f) For these purposes the President should be a member, and be summoned to the War Committee, whenever such cases, or cases in any way affecting the Air Service, are under discussion. There he could, if necessary, argue his case with the Secretary of State or the First Lord, and the War Committee could decide.

(g) It would probably be found desirable, if not to amalgamate the two forces (pending the final report of the Committee) at least to place their directing staffs under a single roof without delay, and eventually to amalgamate both the Designing Branch and the Control Branch. I may add that the greater part of the two staffs are already located outside the War Office and Admiralty buildings.

(h) The Board would gradually undertake the provision both of material and personnel for the two services. Their present strength is Royal Flying Corps, about 25,000 men; Royal Naval Air Service, between 6,000 and 7,000 men.

(i) The Board would, of course, leave all operations to the Admirals and Generals in command.

(j) The entire operations of the Board would be preliminary to the formation of an Imperial Air Service; and if they became convinced of the need, to the creation of a Ministry of Department of the Air.

(k) Until such a department were decided upon, it might be possible to avoid legislation. The Cabinet Minister selected as chairman would answer for the Board in whichever House of Parliament he had a seat. Arrangements would have to be made for some other member of the Government to reply in the other House. Arrangements as to secretarial and other work could probably be made without the need of an Act of Parliament.

If an illustration be required of the smooth working of a Board or Committee constituted without legislation, and yet operating with authority and without friction, I may refer to the Shipping Control Committee, over which I have had the honour to preside for nearly three months, and to which questions of the first importance are constantly referred, not merely for examination, but for *decision* by the Foreign Office, Board of Trade, and other Departments.

These are merely rough ideas as to what such an Air Board might be and do. But I would add that unless its constitution is welcome to the War Office and the Admiralty, unless both these Departments will agree to facilitate a task which must in any case be most difficult, and often odious, unless the Government give the President and his Board executive authority (within the limits above specified), and unless the Cabinet explicitly regard and treat the Board as a possible preliminary to, and, should it be so, as the official precursor of an Air Department in the future, it would be futile to set it up, and no sane man would be found to accept the chair.

I am far from recommending the above tentative and temporary solution to the Prime Minister or to my colleagues. But in examining the question I have felt it to be my duty to leave no avenue unexplored.

C of K

April 16, 1916.

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http://www.airpowerstudies.co.uk/apps/documents/

War Office,
5th September, 1916.

His Majesty the KING has been graciously pleased to award the Victoria Cross to the undermentioned Officer:—

Lt. William Leefe Robinson, Worc. R. and R.F.C.

For most conspicuous bravery. He attacked an enemy airship under circumstances of great difficulty and danger, and sent it crashing to the ground as a flaming wreck.

He had been in the air for more than two hours, and had previously attacked another airship during his flight.

Lieutenant William Leefe Robinson VC, of 39 Squadron, pictured above on 25 September 1916

Lieutenant William Leefe Robinson VC sat in the cockpit of his 39 Squadron BE2c, 2092, in which he shot down the German Army Shutte-Lanz airship, SL11, over London during the night of 2/3 September 1916

September 1916

From: Lieutenant Leefe Robinson, Sutton's Farm.

To: *The Officer Commanding No. 39 H. D. Squadron*. Sir: I have the honour to make the following report on night patrol made by me on the night of the 2-3 instant. I went up at about 11.08 p.m. on the night of the second with instructions to patrol between Sutton's Farm and Joyce Green. I climbed to 10,000 feet in fifty-three minutes. I counted what I thought were ten sets of flares - there were a few clouds below me, but on the whole it was a beautifully clear night. I saw nothing until 1.10 a.m., when two searchlights picked up a Zeppelin S.E. of Woolwich. The clouds had collected in this quarter and the searchlights had some difficulty in keeping on the airship. By this time I had managed to climb to 12,000 feet and I made in the direction of the Zeppelin - which was being fired on by a few anti-aircraft guns - hoping to cut it off on its way eastward. I very slowly gained on it for about ten minutes. I judged it to be about 800 feet below me and I sacrificed some speed in order to keep the height. It went behind some clouds, avoiding the searchlight, and I lost sight of it. After fifteen minutes of fruitless search I returned to my patrol. I managed to pick up and distinguish my flares again. At about 1.50 a.m. I noticed a red glow in the N.E. of London. Taking it to be an outbreak of fire, I went in that direction. At 2.05 a Zeppelin was picked up by the searchlights over N.N.E. London (as far as I could judge). Remembering my last failure, I sacrificed height (I was at about 12,900 feet) for speed and nosed down in the direction of the Zeppelin. I saw shells bursting and night tracers flying around it. When I drew closer I noticed that the anti-aircraft aim was too high or too low; also a good many shells burst about 800 feet behind-a few tracers went right over. I could hear the bursts when about 3,000 feet from the Zeppelin. I flew about 800 feet below it from bow to stem and distributed one drum among it (alternate New Brock and Pomeroy). It seemed to have no effect; I therefore moved to one side and gave them another drum along the side - also without effect. I then got behind it and by this time I was very close - 500 feet or less below, and concentrated one drum on one part (underneath rear). I was then at a height of 11,500 feet when attacking the Zeppelin. I had hardly finished the drum before I saw the part fired at, glow. In a few seconds the whole rear part was blazing. When the third drum was fired, there were no searchlights on the Zeppelin, and no anti-aircraft was firing. I quickly got out of the way of the falling, blazing Zeppelin and, being very excited, fired off a few red Very lights and dropped a parachute flare. Having little oil or petrol left, I returned to Sutton's Farm, landing at 2.45 a.m. On landing, I found the Zeppelin gunners had shot away the machine-gun wire guard, the rear part of my centre section, and had pierced the main spar several times.

I have the honour to be,

Sir,

Your obedient servant,

(Signed)

W. Leefe Robinson, Lieutenant

No. 39 Squadron, R.F.C.

Report by Lt Leefe-Robinson following First successful Engagement of a Zeppelin

APPENDIX 1

MEMORANDUM ON THE ORGANIZATION OF THE AIR SERVICES

By Lieutenant-General Sir David Henderson, July 1917

The Royal Flying Corps came into existence in the month of May 1912. In its original organization it was intended to be a joint service, and was divided into a Naval and a Military Wing, the Central Flying School, the Royal Aircraft Factory, and a Reserve. The intention of the Sub-Committee of the Committee of Imperial Defence which drew up the original scheme, that the Corps should be a joint Corps, is evident from the following questions from its Report, dated 28th February 1912:

> 'While it is admitted that the needs of the Navy and Army differ, and that each requires technical development peculiar to sea and land warfare respectively, the foundation of the requirements of each service is identical, viz an adequate number of efficient flying men. Hence, though each service requires an establishment suitable to its own special needs, the aerial branch of one service should be regarded as a reserve to the aerial branch of the other. Thus in a purely naval war the whole of the Flying Corps should be available for the Navy, and in a purely land war the whole corps should be available for the Army …'

> 'The British aeronautical service should be regarded as one, and should be designated "The Royal Flying Corps". The Flying Corps should supply the necessary personnel for a Naval and a Military Wing, to be maintained at the expense of, and to be administered by, the Admiralty and the War Office respectively. The corps should also provide the necessary personnel for a Central Flying School, and a reserve on as large a scale as may be found possible'.

These different establishments, however, were separately controlled. The Military Wing, Central Flying School, the Royal Aircraft Factory, and the Reserve – with the exception of that portion of it which was composed of officers and men of the regular Naval Service – were under the administration of the War Office; the Naval Wing and the Naval Officers and men of the reserve were to be administered by the Admiralty. In order to ensure co-operation between the two services, a Joint Committee was formed called the Air Committee, composed as follows:

> The Parliamentary Under-Secretary of State for War (Chairman).
> The Commandant of the Central Flying School.
> The Officer Commanding the Naval Wing of the Flying Corps.
> The Commandant of the Military Wing of the Flying Corps.
> The Director of the Operations Division, War Staff, Admiralty.

The Director of Military Training, General Staff, War Office.
The Director of Fortifications and Works, War Office.
The Superintendent of the Aircraft Factory.
Joint Secretaries: A member of the Secretariat of the Committee of Imperial Defence
An Officer of the Naval Flying Staff.

In practice this Committee proved somewhat unwieldy, and as might be expected from its composition, the members were inclined to range themselves into two parties, a Naval and a Military. The only member who, from his position, was entirely unprejudiced was the Commandant of the Central Flying School, who happened to be a Naval Officer – the present fifth Sea Lord of the Admiralty. The Meetings of the Committee, however, were of some value in acquainting each service with what the other was doing, but beyond this no very practical results were achieved from it.

In fact, the two services from the beginning tended to drift apart, rather than come more closely together. The Joint Service was never more than a pious aspiration, and when in 1914 the Naval Wing of the Royal Flying Corps was transformed into the Royal Naval Air Service, the separation became more marked. The Navy had always retained their old Flying School at Eastchurch, so that the one remaining bond of union, the Central Flying School, was not the only source from which the Naval Air Service drew its pilots. The two services were in this state of almost complete separation when the war broke out.

As soon as hostilities began, the necessity for rapid expansion of the air services, both for the Navy and Army, became apparent, and competition was inevitable. In the matter of personnel, the competition was not serious, although there was a great disadvantage in the fact that applicants who had been refused by one service were sometimes accepted by the other, but in the matter of supply, competition was really serious from the beginning, and both services suffered. An effort was made to eliminate this rivalry by dividing up the aeroplane and engine firms in the country between the Royal Flying Corps and the Royal Naval Air Service, but this was a rough-and-ready cut and not satisfactory. In the purchasing of aeroplanes and engines from France, there was direct competition, and there was no method discovered by which independent arbitration between the two services could be brought to bear. The Navy complained that there was really enough material available for both services, which then were very small, but that the methods of purchase by the Royal Flying Corps were slow and inefficient, and that therefore the Army were always trying to grab from the Navy material which the latter had been able to acquire. The Army, on the other hand, complained that the Navy purchased everything in sight, whether they required it or not, that their needs were not nearly so great as those of the Army, and that the material which they were purchasing was not required for proper Naval purposes. These views on both sides may have been justified or not, but there was a good deal of friction amongst subordinates, and not very much good feeling between the personnel of the services.

The necessity for some arbitration between the services, in the matter of supply, was brought to the notice of the War Council. The old Air Committee had from the beginning of the war been dormant, and although never abolished had never met. The new Air Committee under the Presidency of Lord Derby was instituted, but the same defects as with the old became apparent; the Committee had no real power, and was terminated by the resignation of the Chairman. This effort had done no good, so a somewhat more definite attempt was made by the formation of the First Air Board, under the Presidency of Lord Curzon. This Board necessarily took some time to become acquainted with the situation, and to acquire sufficient technical knowledge to know exactly how matters stood. After some months of deliberation, for indeed the Board had no executive power, the Chairman issued a Report recommending a considerable extension of the powers of the Board, in order to enable it to deal with the situation. After considerable discussion, the War Cabinet appointed a second Air Board – the present one – with extended powers, but still so limited that it is only by the exercise of the utmost goodwill by the members of the Board that business can be properly carried on.

The present situation is this: The Board is responsible indirectly, through the Ministry of Munitions, for the supply of all aeroplanes and engines, and many of the accessories of aviation. It is permitted to discuss matters of policy, and to make recommendations thereon to the Board of Admiralty and the Army Council. The rest of the business of aeronautics is still divided between the Navy and the Army, and this remainder includes such important features as the provision of the whole of the personnel, the provision of aerodromes, buildings, and storage accommodation, all training and discipline, all plans of aerial defence, and the distribution of the aerial forces. The Air Board has cognizance of these matters only through the Naval and Military members of the Board. From this it arises that on the adoption of any policy, the responsibility of carrying it out is completely divided at present. For instance: a large increase of the Royal Flying Corps had been sanctioned, the Air Board have to supply the material and the Army Council the personnel; and the division of responsibility goes farther than this. In order to train the pilots, for which the Army Council are responsible, the Air Board must supply training aeroplanes or engines, there will be a shortage of pilots, and if there is a shortage in pilots, all the efforts of the Air Board in providing war aeroplanes and engines will be wasted. Similarly, for the training of pilots new aerodromes are required; the Army Council has to provide these. If the Department of Fortifications and Works should fail to supply the aerodromes, then the Military Aeronautics Directorate will fail to supply the pilots, and again all the efforts of the Air Board will be wasted owing to a failure which is quite outside their control or jurisdiction.

Another important factor in the future of the Air Service is the position of the Airship and Balloon Branch. When the RFC was first formed, all the airships in possession of the Government belonged to the Military Wing. On 1st January 1914 the whole of these were, by a Cabinet order, turned over to the Navy, and since then the Army has had no airships. The RFC, however, still use kite balloons and ordinary spherical balloons in common with the RNAS, and the supply is somewhat complicated.

The real disadvantage of the present system is, however, that no complete view of aerial policy by the Air Board is possible, for the airships are entirely under the Admiralty. It seems probable that the possible use of airships and of aeroplanes or seaplanes coincide at certain points, and if so, it is evident that no complete air policy can be carried out except by a body which has control of both branches.

The Air Board is at present composed of:

A President.
A Parliamentary Secretary.
A Representative of the Board of Admiralty.
A Representative of the Army Council, and Two Representatives of the Ministry of Munitions,

the two latter being business men dealing with the business affairs of Supply. One of the duties of this body is to allocate aeroplanes and engines to the Navy and to the Army. It is evident from the composition of the Board that this allocation must, in the end, be made by the President and the Parliamentary Secretary. In order to enable them to arrive at a correct decision they have nothing to go on except the arguments of the Naval and Military Representatives, and their own common sense and judgement. They have no advisory staff whatever; the Technical Department of the Air Board is concerned only with the technical details of the aircraft and their accessories. In the event of a serious disagreement as to the allocation of aircraft, the Naval and Military representatives have a right to appeal to the War Cabinet through the Admiralty and War Office respectively, and hitherto such a right of appeal has never been exercised. This, however, is rather a tribute to the judgement of the President and the Parliamentary Secretary, and the goodwill of the Naval and Military representatives, than a satisfactory evidence that the organization is properly fitted to carry out its duties. In order to enable the President to consider the larger questions of aerial policy, and to give him the means of forming a correct judgement as to the relative importance of the different methods of employing aircraft, the Air Board ought to be equipped with a staff on the lines of the General Staff at the War Office, or the War Staff at the Admiralty. Under present conditions, however, the formation of such a staff would not be an easy matter.

The only persons with sufficient training and knowledge to undertake such work are either Naval or Military officers, and to place such officers in a position in which their advice might be directly contrary to the policy of their Naval or Military superiors is not quite a workable proposition. Until there is a prospect of a real career in the Air Force, it will be found very difficult to form a staff whose opinions could be accepted as being entirely fearless and unprejudiced.

It is difficult to indicate any method of overcoming the present illogical situation of divided responsibility in aeronautics, except by the formation of a complete department and a

complete united service dealing with all operations in the air, and with all the accessory services which that expression implies. A department would have to be formed on the general lines of the Admiralty and War Office, with a full staff, and with full responsibility for war in the air. Undoubtedly some portion of our air forces must be considered as accessory to the Navy and to the Army, and such contingents would have to be allotted according to the importance of the sea and land operations in progress, but it does not seem necessary that such contingents should be composed of Naval or Military personnel; any suggestions of that kind would only prolong the situation of divided responsibility. Individuals of such contingents might be officers or men of either service, but for their period of service with the Air Forces they would be lent to the Air Ministry, and would be in every respect completely under the control of that Ministry. It would be difficult just now, in the middle of a great war, to train all our pilots in such a manner that they would be equally fitted for land or sea service, and therefore, in the main, the contingents would be composed of the personnel at present employed with the Army and with the Navy. The whole system of training, however, especially in its earlier stages, should be completely unified; and it is only when pilots and mechanics begin to specialize, and then not in all cases, that it would be necessary to earmark them for service by sea or by land. The unification of training ought to have an immediate effect both on efficiency and economy.

It is, of course, evident that until the immediate needs of the Navy and Army can be supplied, there will be no central Air Force available for independent operations. So far as the Army is concerned, however, there is a reason to hope that its immediate needs for fighting, for reconnaissance, and for artillery work, will be met in the early months of next year, and that even then a considerable force of bombing machines will also be available. If the Air Ministry were in existence now, it would be its duty to look ahead and consider the best means of employing this Service, that is to say, considering for instance whether it could be better employed under the direct command of the Commander-in-Chief in France, or only under his nominal command, if service in France, but strategically directed by the General Staff of the Air Ministry. For the present Air Board to undertake such a study would be very difficult, and probably not very useful. There is no staff available to consider such questions except the staffs of the Naval and Military members of the Board, and these officers sit on the Board mainly as representatives of the Board of Admiralty and the Army Council. All investigations of the kind at present are purely Naval or Military, and it is not to be expected that the opinions expressed should be entirely free from the Naval or Military bias of these separate departments.

Yet it is by no means clear that, even on the present programme, we shall reach the limit of desirable expansion in the air forces. The problems of the future should be attacked now, otherwise we may waste force when we have it, or we may want additional force when we might have had it.

Although logically the desirability of a separate unified Air Force is almost beyond dispute, yet in its formation many administrative difficulties will have to be overcome, and this will

be particularly difficult in time of war. In the first place, the formation of a complete staff for the Ministry is necessary; a branch for general staff duties, a branch for personnel, a branch for general and technical material and armament, a branch for works and buildings, and a complete financial establishment. Although these staffs need not necessarily be very large in numbers, it would be difficult to lessen the number of branches, and the finding of experienced personnel capable of taking the necessary responsibility would not be an easy matter at this period of the war. Further, as the Air Service would have to be a third Military Service, and separate from the Army and the Navy, it would be necessary to draw up and pass a Discipline Act on the lines of the Naval Discipline Act or the Army Action; to draw up and promulgate King's Regulations and prepare a Pay Warrant. It must be evident that these duties could not be undertaken by the officers who are at present responsible for the administration of the Air Service. A considerable amount of outside assistance would be required, and even with all possible facilities, this work would add very heavily to the burden of the senior officers and officials who are now connected with aeronautics.

If a scheme for a United air service were definitely adopted by the Government and announced, and measures taken to put it into effect, it is not anticipated that there would be any serious difficulty over the transference of the personnel from their old services to the new. But in this matter a great deal would depend on the definite announcement that the Service was to come into being, and that the scheme would be carried through. Otherwise, it is very likely that there would be a considerable amount of doubt and hesitation among the personnel, which would detract from the efficiency of the Force while the transfer was in progress.

To put it shortly, the formation of a new Air Service, even in war time, is not impossible, and although in certain respects it might cause temporary dislocation and reduction of efficiency, it may be that the final results would entirely outweigh this. The principal objection to carrying it out in war time is that the load of responsible officers is already so heavy that the addition of the considerable amount of somewhat complicated and original administrative work might be a serious distraction.

What had hitherto been considered the main obstacle to the formation of a separate Air Service is, however, a disadvantage that appears rather in peace time than during war. It is due to the consideration that the endurance of any person under the continued strain of flying is normally limited. Before the war it was considered that the active life of a flyer was probably about four years, under peace conditions, but under the stimulus of war, a number of pilots have already exceeded this limit, and the actual period of which a pilot will be able to continue active work is rather a matter of speculation. Undoubtedly, however, there is a limit and, therefore, in so far as the flying officer is concerned, not a very good prospect of a life career in the Air Service. As officers rise in rank above the rank of Flight Commander, their flying is not, in war at any rate, so continuous, but this is chiefly for the reason that in war the responsibility of a Squadron Commander is heavy and his work on the ground is pretty arduous. There is not, in fact, much time for him to fly. In peace, however, in order to

preserve his position and his authority, it will be necessary for a Squadron Commander to fly regularly. There are a certain number of ground appointments which will be open to pilots who have given up flying, but these pilots are not always the most suitable persons for such appointments. The fact has therefore to be faced that, as far as we know at present, there will be a continual flow from the Air Service into civil life, of young men who have been forced to give up flying and for whom no other appointments in the Air Service can be found. In the course of their service, such men would have acquired a considerable amount of technical skill, which might be made available to certain branches of civil life, but even so, it will not be easy to make the prospect of the young officer of the Air Service comparable with the prospects of regular officers of the Navy or Army.

In order to inculcate discipline, to ensure a good system of administration in units, and to infuse a good spirit into the Air Service, it would be most advisable in the early stages to continue to borrow a considerable number of officers, non-commissioned officers or petty officers, from the Army and Navy. The excellent spirit of efficiency of the Royal Flying Corps at the present moment is due almost entirely to the influence of the very carefully selected officers and non-commissioned officers who joined it from the regular Army.

The administrative difficulties of forming a united Air Service in time of war have been indicated, but in this special project of combining the Naval and Military Air Services at the present moment there are many minor and petty difficulties which will have to be considered, if the final decisions are to be accepted with unanimity and approval, and without creating such friction and jealousy as would interfere with the work that has to be carried out till the war is over. The Air Services are composed very largely of quite young men, most of them of a very lively temperament. Such matters as the adjustment of a relative rank in the two Services, or the uniform to be worn, of the titles of rank in the various grades, will be discussed in the Services with a great deal of freedom, and a good deal of prejudice. They would be discussed also, with more prejudice and with less knowledge, in Parliament and in the Press, and our experience in the past does not lead to the belief that either of those bodies will give much assistance in smoothing over difficulties. Personally, I think that if it is decided to form a United Air Service, the more important decisions – if the matter is handled with judgement – will be accepted without much objection, but that there will be the most violent controversies over the petty details.

To sum up the whole question, it seems only right that I should give a personal opinion. I believe that to ensure the efficiency of the Air Services in future, they ought to be combined, and that they should be under the control of a Ministry with full administrative and executive powers. The difficulties of carrying out this policy are purely war difficulties, and I believe that if this policy be carried out during the war, there will be a temporary loss of efficiency, which will be most marked in the administrative offices at present in control, but which must be considered even in the units actually engaged in operations. To minimize this loss of efficiency it would be advisable to draw up a complete scheme for the Air organization, and

to take advice on the legal and administrative questions which have here been touched on, before announcing any change of policy, and after the announcement of the policy, it would be necessary to disregard entirely amateur advice and suggestions, and to leave the Air Board and the Services to work out their own salvation as best they may.

The time which will be occupied in preparing for the change will be considerable, and actually the balance of advantage or disadvantage in making the change depends on the estimate of the Government as to the duration of the war. If it be anticipated that the war will continue until next June, I think the change should be made for reasons of efficiency. But if the war should stop near the end of this year, we should lose rather than gain by attempting at present to alter the present system. The decision, therefore, appears to me to be a speculative one, but only in point of time, for I am convinced that eventually a united, independent Air Service is a necessity.

(*Sgd*) DAVID HENDERSON
Lieut-General DMGA

WAR CABINET

COMMITTEE ON AIR ORGANIZATION AND HOME

DEFENCE AGAINST AIR RAIDS (2nd REPORT)

(For First Report, see G.T.1451)

1. The War Cabinet at their 181st meeting held on 11th July 1917, decided (Minute 3):

"That the Prime Minister and General Smuts, in consultation with representatives of the Admiralty, General Staff and Field Marshal, Commanding in Chief Home Forces, with such other experts as they may desire should examine:

1. The defence arrangements for Home Defence against air raids.

2. The Air organization generally and the direction of aerial operations".

2. Our first report dealt with the defences of the London area against air raids. The recommendations in that report were approved by the War Cabinet and are now in process of being carried out. The Army Council have placed at Lord French's disposal the services of General Ashmore to work out schemes of air defence for this area. We proceed to deal in this report with the second term of reference: the Air organization generally and the direction of aerial operations. For the considerations which will appear in the course of this report we consider the early settlement of this matter of vital importance to the successful prosecution of the war. The three most important questions which press for an early answer are:

1. Shall there be instituted a real Air Ministry responsible for all Air Organization and operations?

2. Shall there be constituted a unified Air Service embracing both the present RNAS and RFC? And if this second question is answered in the affirmative, the third question arises:

3. How shall the relations of the new Air Service to the Navy and the Army be determined so that the functions at present discharged for them by the RNAS and RFC respectively shall continue to be efficiently performed by the new Air Service?

3. The subject of general Air Organization has in the past formed the subject of acute controversies which are now, in consequence of the march of events, largely obsolete, and to which a brief reference is here made only in so far as they bear on some of the difficulties

which we have to consider in this report. During the initial stages of Air development, and while the role to be performed by an Air Service appeared likely to be merely ancillary to naval and military operations, claims were put forward and pressed with no small warmth, for separate Air services in connexion with the two old-established War Services. These claims eventuated in the establishment of RNAS and RFC, organized and operating on separate lines in connexion with and under the aegis of the Navy and Army respectively, and provision for their necessary supplies and requirements was made separately by the Admiralty and War Office to provide a safeguard against the competition, friction, and waste which were liable to arise, an Air Committee was instituted to preserve the peace and secure cooperation if possible. When war broke out this body ceased to exist, owing to the fact that its Chairman and members nearly all went to the front, but after a time it was replaced by the Joint War Air Committee. The career of this body was, however, cut short by an absence of all real power and authority and by political controversies which arose in consequence. It was followed by the present Air Board, which has a fairly well defined status and has done admirable work, especially in settling type and patterns of engines and machines and in coordinating and controlling supplies to both the RNAS and RFC.

4. The utility of the Air Board is however severely limited by its constitution and powers. It is not really a Board, but merely a Conference. Its membership consists almost entirely of representatives of the War Office, Admiralty and Ministry of Munitions, who consult with each other in respect of the claims of the RNAS and RFC for their supplies. It has no technical personnel of its own to advise it, and it is dependent on the officers which the departments just mentioned place at its disposal for the performance of its duties. These officers, especially the Director General of Military Aeronautics, are also responsible for the training of the personnel of the RFC service. Its scope is still further limited in that it has nothing to do either with the training of the personnel of the RNAS or with the supply of lighter-than-air craft, both of which the Admiralty has jealously retained as its special perquisites. Although it has a nominal authority to discuss questions of policy, it has no real power to do so, because it has not the independent technical personnel to advise it in that respect, and any discussion of policy would simply ventilate the views of its military and naval members. Under the present constitution the powers of the Air Board, the real directors of war policy are the Army and Navy, and to the Air Board is really allotted the minor role of fulfilling their requirements according to their ideas of war policy. Essentially the Air Service is as subordinated to military and naval direction and conceptions of policy as the artillery is, and, as long as that state of affairs lasts, it is useless for the Air Board to embark on a policy of its own, which it could neither originate nor execute under present conditions.

5. The time is however rapidly approaching when that subordination of the Air Board and the Air Service could no longer be justified. Essentially the position of an Air Service is quite different from that of the Artillery arm, to pursue our comparison: Artillery could never be used in war except as a weapon in military or naval or air operations. It is a weapon, an instrument ancillary to a Service, but could not be an independent Service itself. Air Service on the

contrary can be used as an independent means of war operations. Nobody that witnessed the attack on London on 11th July could have any doubt on that point. Unlike Artillery, an air fleet can conduct extensive operations far from and independently of both army and navy. As far as can at present be foreseen, there is absolutely no limit to the scale of its future independent war use. And the day may not be far off when aerial operations with their devastation of enemy lands and destruction of industrial and populous centres on a vast scale may become the principal operations of war, to which the older forms of military and naval operations may become secondary and subordinate. The subjection of the Air Board and Service could only be justified on the score of their infancy. But that is a disability which time can remove, and in this respect the march of events has been very rapid during the war. In our opinion there is no reason why the Air Board should any longer continue in its present form as practically no more than a Conference room between the older Services, and there is every reason why it should be raised to the status of an independent Ministry in control of its own War Service.

6. The urgency for the change will appear from the following facts. Hitherto aircraft production has been insufficient to supply the demands of both Army and Navy, and the chief concern of the Air Board has been to satisfy the necessary requirements of those Services. But that phase is rapidly passing. The programme of aircraft production which the War Cabinet has sanctioned for the following 18 months is far in excess of Army and Navy requirements. Next spring and summer the position will be that the Army and Navy will have all the Air Services required in connexion with their operations; and over and above that there will be a great surplus available for independent operations. Who is to look after and direct the activities of this available surplus? Neither the Army nor the Navy is specifically competent to do so; and for that reason the creation of an Air Staff for planning and directing independent Air operations will soon be pressing. More than that: the surplus of engines and machines now being built should have regard to the strategical purpose to which they are going to be put. And in settling in advance the types to be built the operations for which they are intended apart from naval or military use should be clearly kept in view. This means that the Air Board has already reached the stage where the settlement of future war policy in the Air war has become necessary. Otherwise engines and machines useless for independent strategical operations may be built. The necessity for an Air Ministry and Air Staff has therefore become urgent.

7. The magnitude and significance of the transformation now in progress are not easily realised. It required some imagination to realise that next summer, while our Western front may still be moving forward at a snail's pace in Belgium and France, the Air battle front will be far behind on the Rhine, and that its continuous and intense pressure against the chief industrial centres of the enemy as well as on his lines of communication may form an important factor in bringing about peace. The enemy is no doubt making vast plans to deal with us in London if we do not succeed in beating him in the air and carrying the war into the heart of his country. The questions of machines, aerodromes, routes and distances, as well as nature and scope of operations require careful thinking out in advance, and in

proportion to our foresight and preparations will our success be in these new and far-reaching developments. Or take again the case of the subsidiary theatre: there is no reason why we may not gain such an overpowering Air superiority in Palestine as to cut the enemy's precarious and limited railway communications, prevent the massing of superior numbers against our advance, and finally to wrest victory and peace from him. But careful Staff work in advance is here in this **terra incognita** of the Air even more essential than in ordinary military and naval operations which follow a routine consecrated by the experience of centuries of warfare on the old lines.

The progressive exhaustion of the man-power of the combatant nations will more and more determine the character of this war as one of arms and machinery rather than of men. And the side that commands industrial superiority and exploits its advantages in that regard to the utmost, ought in the long run to win. Man-power in its war use will more and more tend to become subsidiary and auxiliary to the full development and use of mechanical power. The submarine has already shown what startling developments are possible in naval warfare. Aircraft is destined to work an even more far-reaching change in land warfare. But to secure the advantages of this new factor for our side, we must not only make unlimited use of the mechanical genius and productive capacity of ourselves and our American Allies. We must create the new directing organization – the new Ministry and Air Staff which could properly handle this new instrument of offence, and equip it with the best brains at our disposal for the purpose. The task of planning for schemes of aerial operations next summer must tax our Air experts to the utmost and no time should be lost in setting the new Ministry and Staff going. Unless this is done, we shall not only lose the great advantages which the new form of warfare promises, but we shall end in chaos and confusion, as neither the Army nor Navy nor the Air Board, in its present form, could possibly cope with the cast developments involved in our new Aircraft programme. Hitherto the creation of the Air Ministry and Air Service has been looked upon as an idea to be kept in view but not to be realised during this war. Events have however moved so rapidly, our prospective aircraft production will soon be so great, and the possibilities of aerial warfare have grown so far beyond all previous expectations, that the change will brook no further delay and will have to be carried through as soon as all the necessary arrangements for the purpose can be made.

8. There remains the question of the new Air Service and the absorption of the RNAS and RFC into it. Should the Navy and the Army retain their own special Air Services in addition to the Air forces which will be controlled by the Air Ministry? This will make the confusion hopeless and render the solution of the Air problem impossible. The maintenance of three Air Services is out of the question, nor indeed does the War Office make any claim to a separate Air Service of its own. But as regards Air work the Navy is exactly in the same position as the Army; the intimacy between normal aerial scouting or observation and naval operations is not greater than that between long range artillery work on land and aerial observation or spotting. If a separate Air Service is not necessary in the one case, neither is it necessary in the other. And the proper and indeed only possible arrangement is to establish one unified Air Service

which will absorb both the existing services under arrangements which will fully safeguard the efficiency and secure the closest intimacy between the Army and the Navy and the portions of the Air Service allotted or seconded to them.

To secure efficiency and smooth working of the Air Service in connexion with naval and military operations, it is not only necessary that in the construction of aircraft and the training of the Air personnel the closest attention shall be given to the special requirements of the Navy and the Army. It is necessary also that all Air units detailed for naval or military work should be temporarily seconded to those services and come directly under the orders of the naval or army commanders of the forces with which they are associated. The effect of that will be that in actual working practically no change will be made in the Air work as it is conducted today, and no friction could arise between the Navy or Army commands and the Air Service allotted to them.

9. It is recognised, however, that for some years to come the Air Service will, for its efficiency, be largely dependent on the officers of the Navy and Army who are already employed in this work or who may in the future elect to join it permanently or temporarily. The influence of the regular officers of both services on the spirit, conduct and discipline of the present Air Forces has been most valuable and it is desirable that the Air Board should still be able to draw on the older services for the assistance of trained leaders and administrators. Further, it is equally necessary that a considerable number of officers of both Navy and Army should be attached for a part of their service to the Air Service, in order that Naval and Military Commanders and Staff officers may be trained in the new arm and able to utilise to advantage the contingents of the Air Forces which will be put at their disposal. The organization of the Air Force, therefore, should be such as to allow of the seconding of officers of the Navy and Army for definite periods – not less than four or five years – to the Air Service. Such officers would naturally, after their first training, be chiefly employed with the Naval and Military contingents, in order to secure close cooperation in Air work with their own services. In similar fashion it would be desirable to arrange for the transfer of expert variant and petty or non-commissioned officers from the Navy and Army to the new Service.

10. To summarise the above discussion we would make the following **recommendations**:

1. That an Air Ministry be instituted as soon as possible, consisting of a Minister with a consultative Board on the lines of the Army Council or Admiralty Board, on which the several departmental activities of the Ministry will be represented. This Ministry to control and administer all matters in connexion with aerial warfare of all kinds whatsoever, including lighter-than-air as well as heavier-than-air craft.

2. That under the Air Ministry an Air Staff be instituted on the lines of the Imperial General Staff responsible for the working out of war plans, the direction of operations, the collection of intelligence and the training of the Air personnel; that this Staff be

equipped with the best brains and practical experiences available in our present Air Services, and that by periodic appointment to the Staff of officers with great practical experience from the front, due provision be made for the development of the Staff in response to the rapid advance of this new Service.

3. That the Air Ministry and Staff proceed to work out the arrangements necessary for the amalgamation of the RNAS and RFC and the legal constitution and discipline of the new Air Service, and to prepare the necessary draft legislation and regulations, which could be passed and brought into operation next autumn and winter.

4. That the arrangements referred to shall make provision for the automatic passing of the RNAS and the RFC personnel to the new Air Service, **by consent**, with the option to those officers and other ranks who are merely seconded or lent of reverting to their former positions.

There are legal questions involved in this transfer and the rights of officers and men must be protected, but no dislocation need be anticipated.

5. That the Air Service remain in intimate touch with the Army and Navy by the closest liaison, or by direct representation of both on the Air Staff, and that, if necessary, the arrangements for close cooperation between the three Services be reviewed from time to time.

6. That the Air Staff shall from time to time attach to the Army and the Navy the Air Units necessary for naval or military operations, and such units shall, during the period of such attachment, be subject for the purpose of operations, to the control of the respective naval and military commands. Air Units not so attached to the Army and Navy shall operate under the immediate direction of the Air Staff.

The Air Units attached to the Navy and Army shall be provided with the types of machines which these Services respectively desire.

7. That provision be made for the seconding or loan of regular officers of the Navy and Army to the Air Service for definite periods, such officers to be employed, as far as possible, with the naval and military contingents.

8. That provision be made for the permanent transfer, by desire, of officers and other ranks from the Navy and Army to the Air Service.

11. In conclusion we would point out how undesirable it would be to give too much publicity to the magnitude of our Air construction programme and the real significance of the changes in organization now proposed. It is important for the winning of the war that

we should not only secure air predominance, but secure it on a very large scale; and having secured it in this war we should make every effort and sacrifice to maintain it for the future. Air supremacy may in the long run become as important a factor in the defence of the Empire as Sea supremacy. From both these points of view it is necessary that not too much publicity be given to our plans and intentions which will only have the effect of spurring our opponents to corresponding efforts. The necessary measures should be defended on the grounds of their inherent and obvious reasonableness and utility, and the desirability of preventing conflict and securing harmony between naval and military requirements.

2 Whitehall Gardens SW
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