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HISTORY OF THE GREAT WAR

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BY DIRECTION OF THE HISTORICAL SECTION OF
THE COMMITTEE OF IMPERIAL DEFENCE

THE WAR IN THE AIR

Being the Story of
The part played in the Great War
by the Royal Air Force

VOL. V

BY

H. A. JONES

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PREFACE

IN this volume the story of the German air attacks on Great Britain is completed by an account of the raids which took place during 1917 and 1918. Their effect upon British war policy is noted, and the narrative includes also home anti-aircraft defence developments, and such matters as the provision of air-raid shelters, the training of pilots for night flying, and the technical equipment of the home defence squadrons.

By courtesy of the German authorities the author consulted, at the *Marinearchiv* in Berlin, the official records of the Zeppelin attacks. It was revealed that there were more instances in 1917 and 1918, than in the earlier years, of faulty British observation of the movements of the raiding airships. This may be set down as due to the greater heights at which the airships were navigated, and to a depletion of the observer posts in Britain because of the need to save man-power. On the other hand it was often impossible for the Zeppelin commanders, owing to the heights from which the attacks were delivered, sometimes from above thick cloud banks, to check their positions by direct observation. They, also, like the defence personnel, groped for their targets with more difficulty and with less success than in the earlier years.

The author offers his thanks to Admiral Assmann, President of the *Marinearchiv*, and to Kapitän z. See Weniger, the naval historian, for their courteous help. As a result of the freedom with which the author was permitted to work among the German records, his narrative has gained in understanding as well as accuracy.

The air-raid maps in the separate case show the paths of the raiders according to British observation at the time, but the author has brought the identities of the airships into line with the German official records. Where differences cannot be reconciled a note has been added to the map. The movements of the raiding aeroplanes were less easy to follow than were those of the airships. The

aeroplanes came with little or no warning, operated in a more restricted area, passed swiftly on their way, and called up many defence aircraft to add to the confusion. Almost consistently the numbers of raiding aeroplanes were exaggerated. The maps showing the aeroplane attacks should be looked upon as of general rather than of particular accuracy. They will not be superseded, but they have been compiled from human observation which, whether from the air or from the ground, was fallible.

This volume also deals with the air operations connected with the military campaigns in Egypt, Sinai, the Western Desert, Darfur, Palestine, Arabia, Mesopotamia, and in Macedonia, and with naval air operations in the Mediterranean and Red Seas. The period covered extends approximately to March 1918. Finally, there is an account of the training developments at home, in Egypt, and in Canada.

The reader will find, in the narrative dealing with the subsidiary campaigns, frequent mention of the exploits of individual pilots. He may perhaps think that there has been a change of scale, but he will realize that in the battles fought outside the main theatre of war single aeroplanes sometimes mattered greatly. His attention, as an example, might be directed to the story of the actions leading to the siege of Kut. When Major-General C. V. F. Townshend was ready to fight the battle of Ctesiphon a pilot discovered the arrival of the Turkish 51st Division. He was alert to the importance of his discovery and made a careful study of all he saw, but when the reconnaissance had been completed a chance hit by a shell splinter put the engine in his aeroplane out of action and forced him to land within the Turkish lines. Although, as Mr. Arthur Balfour once said, when discussing an Air Board memorandum, 'imaginary history is very easy to write and quite impossible to refute', it may be stated as unlikely that Major-General Townshend would have fought the battle of Ctesiphon if the aeroplane had returned with the news of the arrival of the

relatively formidable Turkish reinforcements. There might have been no siege of Kut and no consequent costly attempts at relief. The small piece of shell which sufficed to bring down the reconnoitring aeroplane can be said to have carried with it suffering and death for thousands of men.

Again, the first battle of Gaza, the failure of which changed the aspect of the campaign in Palestine, was lost mainly because the German air observers gave an emphatic warning to the Turkish command of the impending British attack. The military student who studies the dispositions of the Turkish forces before changes were made as a result of the air reports may find it difficult to believe that the battle could have been lost if the original Turkish dispositions had been maintained. When the third battle of Gaza, prelude to the fall of Jerusalem, was fought, the Royal Flying Corps had local air superiority. The success of General Allenby's brilliant plan depended upon surprise. The British pilots had the equipment which enabled them to play their allotted part in the preliminary efforts by which surprise was achieved. One German aeroplane which, helped by patches of cloud, eluded the British patrolling aircraft and closely reconnoitred the British area just when the concentration for the battle had been completed, was shot down on its homeward journey, and the observer's report, of vital military importance, never reached the enemy command. These instances are of a kind which may serve to show why it has been necessary to examine the campaigns in some detail.

The author records his thanks to the Military Historical Section with regard to maps Nos. 6 to 20 inclusive, which, sometimes with minor adaptation, have been taken from the separate military histories of the campaigns in Egypt and Palestine, in Mesopotamia, and in Macedonia. He has also, once again, to pay tribute to the help he has received from Professor Nichol Smith, and from the staff of the Air Historical Branch.

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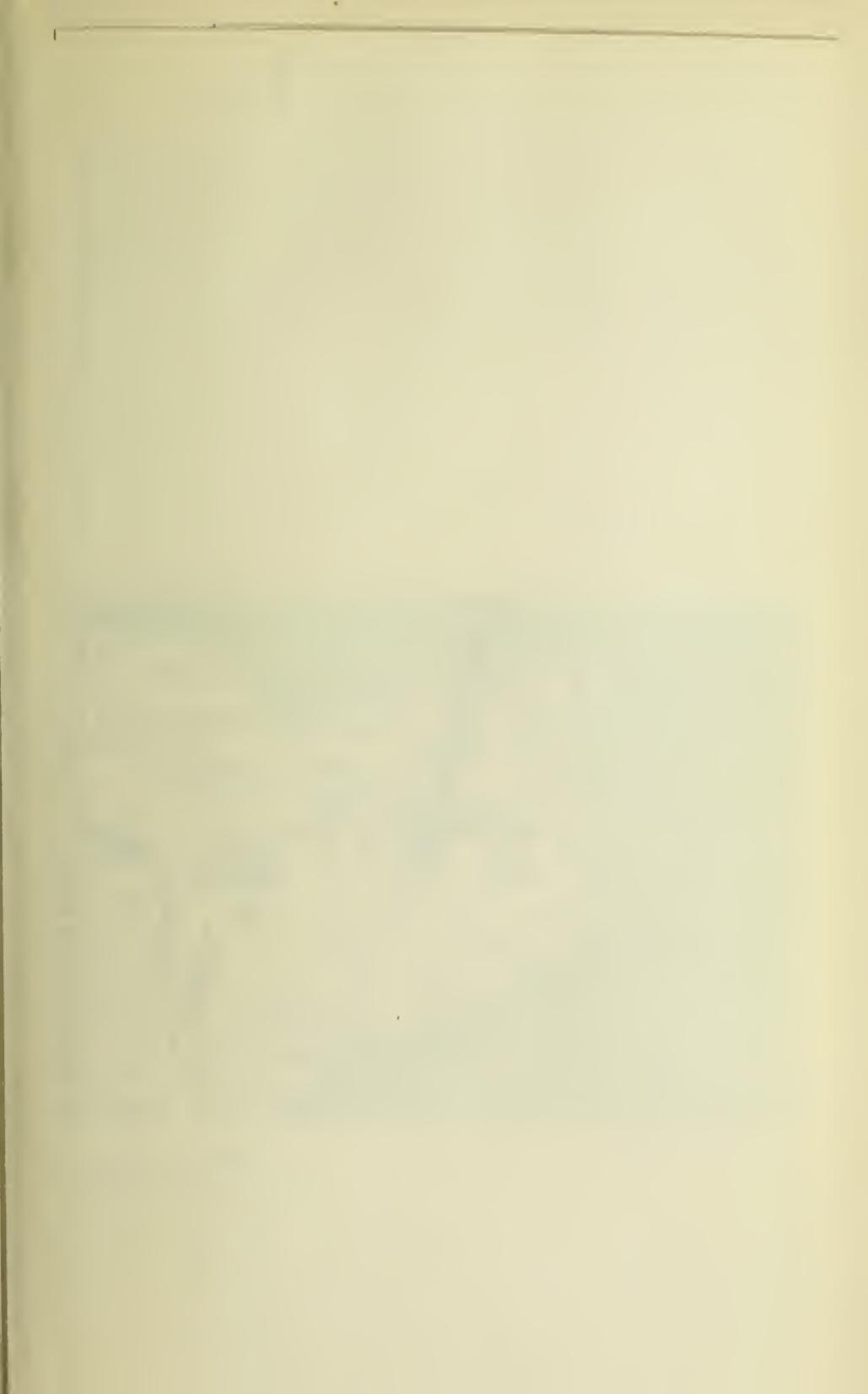
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CHAPTER I

GERMAN AIR RAIDS ON GREAT BRITAIN

1917-18

IN the third volume of this history the German airship and aeroplane raids on Great Britain were dealt with to the end of 1916, and the reader may recall that as that year came to its close there was cause for a feeling of greater confidence on the home front. Those responsible for the air defence of the country no longer feared the airship. It was to be expected that, soon after the naval raiding Zeppelins left their sheds on the north German coast, the usual wireless warnings would be received in England, so giving ample time in which to set in motion the various defence measures. The German crews, as they approached the British coasts, would find the gun and searchlight personnel alert at their posts, and if the Zeppelin commanders attempted to reach targets of any importance they would have to reckon, in addition, with patrolling aeroplanes. It seemed reasonably certain, at the end of 1916, that once an aeroplane, with its incendiary ammunition, came within striking distance of a Zeppelin the giant gas-bag was doomed. Even if airship raids developed without previous warning it appeared unlikely that a ship which penetrated any distance inland would get out again without being attacked from the air. Nor, by the end of 1916, were there any indications of possible serious attacks by heavier-than-air craft. Such aeroplane or seaplane raids as had taken place had been unimportant and had posed no problems for the defence. At the beginning of 1917, therefore, people in England went to their beds with no particular thought about the threat from the air. As, however, the year progressed, it came to be realized that the feeling of confidence was premature, that the airship threat had not lost its force, and that another menace, more formidable, had arisen.

*Lighting Restrictions*¹

The feeling at the end of 1916 that serious air attacks

¹ *Tables of Local Sunset* had been issued by the Home Office in November

had, perhaps, ended, led to suggestions from many quarters that the lights should be turned up a little at night. So far as London was concerned the military authorities shared the wish for better street lighting because it would assist military traffic. Their view was that so long as any lighting that was at all useful was maintained London was fairly well defined to aircraft approaching within twenty-five miles, and that the existing restrictions were not therefore justified by considerations of defence. After much discussion the lights of London were made a little brighter, but not for long. At the beginning of 1917 the coal controller was urging economy in the consumption of coal, and various lighting authorities, anxious to help, suggested a reduction of street lighting once more. The position was therefore again reviewed early in 1917, and as a result it was agreed that an additional one-third of the lamps in the London area should cease to be used.

The nocturnal gloom in London was bad enough, but it was even more profound in some provincial cities, and the cry for more light went up from many places in the midlands and in the north. Representations were made from Lancashire that it was inconvenient and even dangerous for the workers, most of them girls, to be compelled to go to and from their work through unlighted streets, and the Chief Constables of Lancashire were therefore empowered, at the beginning of 1917, to arrange for a modest increase in lighting, especially in the early morning. It soon became clear, however, that the lighting position outside London needed consideration as a whole, and the County and Borough Chief Constables were therefore called into conference in February 1917. It was revealed during the conference that some cities had almost abandoned street lighting. In Sheffield, for example, out of a total of 12,000 lamps no more than forty-five were in use, and even these few were extinguished at 7.30 p.m. After that time the only lighting in the streets was supplied by the headlights on tramcars, which ceased to run at 11 p.m.

1916 and placed on sale by the Stationery Office. They provided a ready means for determining the hour at which the various Light Orders took effect, according to locality and times of the year.

In general, it appeared that the number of street lamps in use in the various towns was from about one-quarter to one-fifth of the total. Most of the lamps were gas-lighted, and it took time to get them extinguished after receipt of the order for air-raid action.

The Chief Constables, however, were, for the most part, against an increase of lighting in provincial towns. They argued that the public had become accustomed to the darkness, and they feared that if the restrictions were relaxed one result might be undesirable competition in brightness between one town and another. In the result little or nothing was done to improve the lighting in the midland and northern industrial towns, and pedestrians had to continue to grope their way about at night with the help of electric torches. The state of mind of some local authorities is revealed by the fact that there were prosecutions and convictions for striking matches on the sea-front, or even inland in the open, until Chief Constables were informed from Whitehall that such prosecutions were unnecessary.

In May 1917 further lighting restrictions, applicable to the whole of England and Wales, were made at the request of the coal controller. These prohibited the use of illuminated advertisements, of lights outside or at the entrance to any place of amusement, and of all lighting inside shop premises for display or for advertisement after the shops had been closed. These restrictions, imposed under the 'Advertisement Lights Order', took effect from the 29th of May 1917 and remained in force for two years.

There is no doubt that the darkening of English cities was overdone. It is true, as has been made clear in this history, that the German Zeppelin crews often searched in vain for suitable bombing targets and that they passed over many darkened Midland cities unaware of what lay beneath them. The warning system, however, worked so well on the whole that it is difficult to find justification for permanent gloom from one end of the country to the other. The requirement of General Head-quarters, Home Forces, was that all lights which might be visible from enemy aircraft must be put out within five minutes

of receipt of the order *Take Air Raid Action*. Chief Constables were mainly concerned to see that no more street lamps were lighted than could be extinguished within the prescribed time. The public, however, were alive to the importance of obscuring lights when warnings of attack were given, and it is probable that responsible volunteers could have been enrolled, and adequate arrangements made, to extinguish when necessary those street lamps which required to be put out by hand. Although the need to save coal was an urgent one, it is doubtful whether the economy of a few thousand tons at the expense of street lighting compensated for the disadvantageous effects, chiefly psychological, but also material, of the increased obscurity. Against this it is fair to point out that in those areas where the passage of enemy aircraft was fairly frequent, the public derived from the darkness a feeling of security and might not have tolerated any appreciable increase of street lighting.

Reductions in the Defences

Meanwhile, at the beginning of 1917, the Government were anxiously concerned with the problem of the German U-boat, a problem which, unexpectedly perhaps, greatly affected the home anti-aircraft organization. There was little doubt that submarine warfare would be intensified in 1917, and it was clear that the existing countermeasures would be ineffective. It was said that if the losses in merchant tonnage, due to the U-boats, were not curtailed, the importation of food and other necessities into the Allied countries might be so seriously affected that, by the early summer of 1917, peace might have to be sought on terms not justified by the military situation. Contemporary naval opinion was fairly agreed that, to counter U-boat activity, more merchant vessels must be armed. It was estimated that about 3,000 merchant vessels were in danger areas at any one time, but that only some 1,200 of them were equipped with a more or less efficient gun. The naval view was that guns should be diverted from home defence for the protection of merchant shipping, and the argument was put forward that, even

if the Zeppelin had not been defeated, it was necessary to ensure against the greater risk. Whereas the depredations of the U-boats might mean the loss of the war, it was unlikely that airship attacks could have a similar effect. Furthermore, aeroplanes and not guns must be considered to be the chief weapons of attack against Zeppelins.

It was perhaps inevitable that, in the circumstances of the time, the Government should decide to divert deliveries of guns, authorized for home defence, to the mercantile marine. In January 1917 the authorized allotment of guns for home defence, mostly 3-inch, totalled 403¹ fixed, 78 mobile, and 12 for training purposes. Of the 3-inch guns 169 had been delivered, but as a result of the Government decision it was arranged that the 186 guns outstanding, together with eleven 2.95-inch guns on order, should be delivered to the Admiralty. In consequence the home-defence organization had to be remodelled. Under the existing scheme London was, eventually, to have had a total of 84 guns, but, on the new basis of distribution, this allotment was cut down to 65 and, in January 1917, existing guns above this number were withdrawn.² The system of double gun stations in London was abandoned, except for the station at Hyde Park, and the surplus guns were used to strengthen the defences north and east of the capital.

At the end of 1916, the anti-aircraft gun and search-light defences in the London area had been placed under one commander. Up to this time the seven sub-commanders in this area had been under the G.O.C., London District, for training, and under Lord French, the Field-Marshal Commanding-in-Chief, for operations.³ Outside the London area each Anti-Aircraft Defence Commander was responsible both for training and operations, and it

¹ 355 3-inch 20 cwt.; 36 12-pdr.; 11 2.95-inch; and 1 4-inch.

² At the beginning of February 1917 the London gun defences were: 48 3-inch 20 cwt.; 16 French 75 mm.; 1 12-pdr.; and (temporarily) 1 3.5-inch.

³ The seven sub-commands were: Dartford (Perry Street); North-West (Wembley); South (Hilly Fields Schools); South-West (Putney); Waltham (Monkhams Hall); and Woolwich (Plumstead); Central (Whitehall Gardens, S.W.1).

appeared anomalous that in London, the most important area to defend, there should be no central commander. Early in December 1916, therefore, Lieutenant-Colonel M. St. L. Simon, R.E., who had been brought home from France in February 1916 to supervise the construction of gun and light positions in the London area, was given the command with the title of Anti-Aircraft Defence Commander, London. He was placed under the orders of the Field-Marshal Commanding-in-Chief, for training and operations, and of the G.O.C., London District, for administration and discipline. On taking up his appointment Lieutenant-Colonel Simon found that there was a lack of uniformity in equipment and in the methods employed in the various London sub-commands, and he took immediate steps to simplify and to standardize both equipment and methods so far as it was possible to do so. He also elaborated a scheme whereby the searchlights were to co-operate to provide an orderly 'light' patrol around London. It had been noted that when a Zeppelin had been destroyed in the air over England, other Zeppelin commanders who had been witnesses of the disaster had appeared to abandon their attacks, and Lieutenant-Colonel Simon believed, therefore, that if the London searchlights were uncovered when Zeppelins were still at a great distance, the moral effect might be such that the commanders would not persist on their journey towards the capital. Acting on this belief, he issued orders that if and when airships approached the London area, the searchlights and guns were to be used without hesitation and that they were to open at long range. The main object, he said, was to keep the enemy away from the capital: the destruction of the hostile craft was a secondary aim. This policy of unmasking all the searchlights was adopted on the two occasions in 1917 when Zeppelins appeared to be making for London.

The intention, when the appointment of an Anti-Aircraft Defence Commander, London, was made, was that the seven sub-commands should be regrouped and reduced to four, but it was not until April 1917 that this reorganization became effective. The new sub-commands and their head-

quarters were as follows: *North*, Waltham; *East*, Plumstead; *West*, Putney; and *Central*, Whitehall Gardens.

The reductions in the home anti-aircraft defences extended also to the aeroplane squadrons. On the 6th of February 1917 Sir David Henderson, director-general of military aeronautics, informed the Chief of the Imperial General Staff that the Royal Flying Corps in France was in urgent need of the services of two of the five night-flying squadrons which had been sanctioned for duty in the field, and he stated that two squadrons could be sent to France at the beginning of March if pilots were taken from the home-defence squadrons. Thirty-six pilots would be required immediately, and he estimated that there would be a call for nine additional pilots each month as reinforcements. 'It is considered 'from a Royal Flying Corps standpoint', said Sir David Henderson, 'that the diminished risk from Zeppelin 'attack amply justifies this temporary reduction.' The matter was brought to the notice of the War Cabinet three days later and no objections were raised.

A few days after this decision was made, that is to say on the night of the 16th/17th of February 1917, the military Zeppelin *LZ.107* dropped bombs near Calais, without effect, and then crossed to the English coast. She was seen over Deal about 2.0 a.m. and was afterwards heard off Ramsgate, but no bombs from her fell on English soil, and she was later reported over Holland on her way back to Germany. The incursion of the Zeppelin was without significance, but it led to a multitude of rumours which showed that public disquiet might again be quickly roused. It was freely reported, for instance, that the Zeppelin had been accompanied by fighting aeroplanes, but there was no evidence to support this statement. There followed, on subsequent nights in February, many rumours of airship activity in the area of the Downs, but they had, so far as is known, no foundation in fact.

These alarms, however, did not affect the official outlook, and on the 6th of March a conference was held at the Horse Guards to explore ways and means still further to reduce the number of pilots and aeroplanes allotted to

home defence, and of the personnel manning guns and lights. Many suggestions were considered, but the most important was one put forward by Lord French that fire should not be opened against hostile aeroplanes or seaplanes except by those guns which were situated near the coast within the probable region of enemy aeroplane attack. The members of the conference endorsed this recommendation, and orders of Lord French, Field-Marshal Commanding-in-Chief, Home Forces, issued next day, the 7th of March, stated: 'No aeroplanes or seaplanes, even if recognized as hostile, will be fired at, either by day or night, except by those anti-aircraft guns situated near the Restricted Coast Area which are specially detailed for the purpose.'

That is to say the anti-aircraft gunners, outside the specified coastal areas, were prohibited from firing at enemy aeroplanes and, in view of what was to happen within a few weeks, the order may be read with surprise. It certainly reflects the confidence of the home authorities, but the reader should also remember that the calls for trained personnel which came from the Western front were urgent. It was no longer necessary, under the new order, that the defences, outside the coastal areas, should be fully manned by day, and it was possible, therefore, to make a considerable reduction in the home-defence gun-detachments. At the time the order was issued the Anti-Aircraft Defence Commander, London, was preparing plans for gun-fire to meet possible aeroplane attacks, but as the general feeling was all against such a possibility, he received neither encouragement nor assistance in the preparation even of an emergency scheme. This, however, did not deter him from working out a detailed plan which he kept ready for immediate issue if and when the order not to fire should be cancelled.¹

Zeppelin Attacks²

Map 1 On the 16th of March a raiding squadron of five naval

¹ This happened on the 7th of June. See p. 26.

² For a statistical summary of airship raids 1917-18, see Appendix I, Table 'A'. For the maps, noted in the margin, see separate case.

Zeppelins of the latest type, *L.35*, *L.39*, *L.40*, *L.41*, and *L.42*, set out to bomb southern England, with London as the main objective.¹ The weather conditions were peculiar. When the airships began their journey an anti-cyclone covered southern England and northern France and extended well into Germany, but the not unfamiliar depression from Iceland was approaching our north-western seaboard, and by the time the airships were nearing the British coast the depression had spread eastwards and the velocity of the wind over the North Sea had increased to forty miles an hour at 1,500 feet. That is to say there was a fast moving storm area bearing down on the airships which was calculated to make their passage over England, and especially their return journey, hazardous.

The first airship to reach the coast was the ill-fated *L.39* (Kapitänleutnant Robert Koch) which appeared over Margate at 10.20 p.m. She moved across Kent, by way of Ashford, to St. Leonards and Bexhill, and ultimately went out to sea at Pevensey Bay at midnight. She dropped six bombs on land, which damaged two cottages, and other bombs from her were heard exploding in the Channel. About 3 a.m. the *L.39* was west of Dieppe, and she afterwards ran across France towards Paris, but, short of Mantes, turned back again and then pursued an easterly course with the evident intention of passing over the trenches. Dawn was approaching and it is possible that Kapitänleutnant Koch decided that he could avoid attack in the battle-field area if he shut off his engines and ran, noiselessly, before the wind. At 5.25 a.m., however, the *L.39* was seen over Estrées and, five minutes later, was dimly outlined to French gunners at Compiègne. She

¹ Strasser's operation orders show that Great Britain was divided into three areas: *North* was north of lat. 54°; *Middle* was between lat. 54° and lat. 53°; and *South* was south of lat. 53°. The main objectives in the north were given as the Firth of Forth, Edinburgh, Glasgow, and the mouths of the Tyne and the Tees. In the middle they were Manchester, Liverpool, and the Humber mouth area; and in the south, London, Birmingham, and Bristol. Attacks were ordered, according to the weather conditions, simply as *north*, or *middle*, or *south*, and the airship commanders could apparently exercise freedom of choice of objective within the area defined.

was almost stationary, possibly because her engines had frozen and could not be restarted, and during a fifteen-minute bombardment in the half light more than one hundred shells were fired at her by the French gunners before she was hit and fell flaming to earth within view of the German trenches.

This was the climax of a night which had kept the Western front alert. The *L.35* (Kapitänleutnant Herbert Ehrlich) had come in at Broadstairs at 10.45 p.m. and, at first, had followed much the same course as the *L.39*, but after circling over Ashford she had moved off towards Dover, west of which she went out at 12.15 a.m. The *L.35*, which encountered heavy snow, crossed the French coast near Calais, ran across Belgium, and eventually landed at Dresden with one of her engines out of action. Twenty bombs from her had fallen on England, three of them of 660-lb. weight, but they exploded in open country and caused no casualties and only slight material damage. The *L.40* (Kapitänleutnant Sommerfeldt) passed the coast late, about 1 a.m. at Herne Bay, and moved over Kent to Romney Marsh where she dropped thirty-one bombs in the open. She then crossed to France and ultimately passed by way of St. Omer and Béthune over the trenches near La Bassée at 3.20 a.m.

The *L.41* (Hauptmann Manger) made a slow approach down Channel and came overland south of Winchelsea at 1.20 a.m., dropping ten bombs as she came in. The ship passed near Rye, dropping more bombs on Camber Marsh and along the river Rother, and then went out to sea at Dungeness. She crossed the French coast at Boulogne and followed a south-easterly course over France, passing the trench lines near Cambrai on her way back to Ahlhorn. It is clear from the official reports of the *L.41* that Manger was deceived by the difficulties of navigation. Ice and snow made the airship heavy and he decided that he could not reach London, but would, instead, attack Harwich. From the data on which he had to work he was justified in assuming that his attack had, in fact, been made on Harwich. The *L.42* (Kapitänleutnant Martin Dietrich), in which was Fregattenkapitän

Peter Strasser, was known to have cruised about off the Dutch and Belgian coasts, but she evidently had difficulty of some kind and turned back to Germany across Belgium.¹

The raid was defeated by the weather conditions. The German official records leave no doubt that the unexpectedly strong winds blew the airships off their course and that the commanders, in trying to check their bearings, received only scant help from the wireless stations, and none at all from direct observation. Sommerfeldt, for example, in the *L.40*, thought that his bombs had been dropped on London, and it is true that the chart of his course, as mapped in the airship, was roughly parallel with his track over the ground as observed by us. The difference is that he, as did the other commanders, thought he came in farther north, near Mersea Island, and his subsequent miscalculation about the fall of his bombs was a consequent mistake. Because of the heavy cloud-banks that lay over Kent and the north of France while the Zeppelins were about, the searchlight, gun, and aeroplane defences could do little. Sixteen pilots went up in England, but they saw nothing and one of them crashed and was killed.²

Lord French was inclined to blame the reductions in the defence personnel for the fact that the Zeppelins got away from England without mishap. On the 20th of March 1917, in a letter to the Army Council, he pointed out that the average number of pilots and aeroplanes available for night flying in the Home Defence Wing had been 130 and that this number, although smaller than originally contemplated, had sufficed for the maintenance of an effective patrol. The strength in pilots when the raid of the 16th/17th of March was made was 71, and Lord French stressed the point that among those pilots who had been sent overseas were many who had fought the Zeppelins, successfully, in the autumn of 1916. 'I recognize', he said, 'that the claims for trained pilots for overseas are all 'important, but in view of my responsibility for Home

¹ The log of the *L.42* shows that one of her engines went out of action, and it was therefore decided, because of the difficult weather conditions, to abandon the raid.

² One of the defence aeroplanes was seen from the gondolas of the *L.40*.

'Defence it is necessary for me to say that in my opinion 'the Home Defence Wing, Royal Flying Corps, has been 'reduced to a dangerously low point, and one which does 'not enable the general scheme of defence on which the 'present disposition of the squadrons is based to be carried 'out effectively. The escape of the airship which raided 'Kent and Sussex on the 16th/17th instant was, notwith- 'standing the unfavourable weather conditions, in my 'opinion due to this cause.' He asked that a minimum strength in pilots and aeroplanes should be fixed, and he stated that the existing scheme of aeroplane defence would require 100 trained night pilots. The War Office replied that the requirements for Home Defence were receiving close attention, but said that the shortage at home was not disproportionate to that existing in Royal Flying Corps establishments overseas, and that no minimum of aeroplanes or personnel could be fixed for any theatre of war.

Map 2 The next Zeppelin attack on England took place, in conditions of snow and hail in the upper air, on the night of the 23rd/24th of May. Six airships, *L.40*, *L.42*, *L.43*, *L.44*, *L.45*, and *L.47*, crossed the North Sea in the afternoon of the 23rd, but one of them, the *L.44* (Kapitänleutnant Stabbert¹), had engine trouble and turned back and limped slowly home. Nothing could be seen owing to the thick clouds, and Stabbert, calculating that he was going out over Harwich, dropped his load of fourteen high explosive and twenty incendiary bombs. No bombs from his ship were found on land and they were presumably dropped in the sea soon after he had re-crossed the coast. The *L.42* (Kapitänleutnant Martin Dietrich) came farthest inland. She moved over Essex to Braintree, but just when it appeared that she was shaping course for London, where all the searchlights were exposed for 'moral' effect, she turned north-west and, later, north-east, and ultimately went out to sea near Sheringham at 3.25 a.m. after being overland for three hours. The bombs which came from her exploded in open country without doing damage. The

¹ Stabbert, who commanded the *L.20* when she was wrecked in Norway after raiding Scotland in May 1916 (see Vol. III, pp. 212-13) had escaped from internment.

German official records show that the attempt by the *L.42* to reach London had to be abandoned because of engine trouble and strong head winds. The ship passed through violent storm areas and was three times encircled with lightning.

The *L.45* (Kapitänleutnant Waldemar Kölle) passed across Suffolk and Norfolk through an area of thunderstorms, but no more than two bombs were traced from her on land, although it is possible that some of the bombs on Norfolk villages attributed by us to the *L.43* came, in fact, from the *L.45*.¹ The *L.43* (Kapitänleutnant Kraushaar) came in later than the *L.45*, but she followed a similar course across Suffolk and Norfolk and dropped thirty-eight bombs in fields and on villages, killing one man and damaging cottage property. She made a safe journey home, but did not much longer survive; on the morning of the 14th of June she was destroyed off Vlieland by a flying-boat from Felixstowe.²

The *L.47*, flying at about 18,000 feet with a star-lit sky above and massed clouds below, did not, according to our observation, come overland. From his wireless information her commander thought he crossed the coast south of Lowestoft and he then dropped three bombs to bring the searchlights or anti-aircraft guns into action. As there was no response (these bombs must have fallen in the sea) and because visibility was nil, the attack was abandoned and the *L.47* carried her main load of bombs home again. Kapitänleutnant Sommerfeldt in the *L.40* was overland only a short time and his bombs, except two, appear to have been dropped at sea. According to the German official records Sommerfeldt gave up the attempt to reach London because of engine trouble and dropped his bombs, as he thought, in the neighbourhood of Norwich. One of his bombs, of 660-lb. weight, fell in the open at Little Plumstead, four miles east of Norwich, but no other bombs were traced in this area.

¹ Kölle thought his attack was made on Norwich. He, like some of the other airship commanders, came farther inland, and on a more northerly course, than his calculations and his wireless reports led him to believe.

² See Vol. IV, p. 20.

It so happened that about an hour after the *L.40* had re-crossed the coast on her homeward journey a flying-boat from Yarmouth, piloted by Flight Lieutenant C. J. Galpin, set out for Terschelling in the hope that one or more of the returning Zeppelins might be encountered. The tracks of the Zeppelin and of the flying-boat show that they were flying on converging courses, but clouds and rain squalls curtained the scene and it was not until about 5.30 a.m., when the flying-boat had already turned back, that the *L.40* suddenly appeared out of a cloud a mile ahead. Sommerfeldt received no answer from the flying-boat to his recognition signals and he quickly realized that his only chance of safety lay in the clouds. He dropped his two remaining bombs to lighten the ship and climbed as rapidly as he could, but he must have been aware, as he watched the flying-boat bearing down on him at full speed, that it would be touch and go. Flight Lieutenant Galpin had approached within 300 yards when the nose of the Zeppelin met the clouds. There was just time to get half a drum of incendiary ammunition in her direction, without effect, before she was lost to view. The log of the *L.40* shows that she, also, opened fire with her machine guns for a few brief moments when the flying-boat was near and that Sommerfeldt subsequently sent out a wireless message, addressed to all naval airships, warning them of the presence of enemy aircraft. There were, however, no other encounters. The flying-boat flew on towards Yarmouth without incident until it was forced down through petrol shortage near Cromer Knoll, whence it was taken in tow by a trawler.

Many other naval and military pilots went up to combat the raiders, but the cloud banks and the poor visibility made the task somewhat hopeless. Among the aircraft which ascended were two Sopwith 'Baby' seaplanes, at 3.40 a.m., from the Westgate air station. The two pilots searched independently for some hours, and at 6.45 a.m. one of them, Flight Sub-Lieutenant H. M. Morris, returned to his station, but time passed and the second pilot did not come in. At 8.10 a.m. Flight Sub-Lieutenant Morris, with Air Mechanic G. O. Wright, went out in a

Short seaplane to look for the missing Sopwith 'Baby' seaplane which, it was now clear, must have been forced down somewhere on the sea. As it happened, this seaplane, in a damaged condition, had been taken in tow by a hopper from the Isle of Grain and was already safely in port when the Short began to search for her over the North Sea.

What happened to the Short was told later by Flight Sub-Lieutenant H. M. Morris in his report: 'On Thursday 24th at 8 a.m. I was ordered with A. M. 2nd Class Wright (W/T) as observer to go in search of Flight Sub-Lieutenant Maxton who had failed to return. I set out steering East for 30 minutes, then I turned N.W. for 5 when my engine suddenly stopped. I was forced to land. The sea was choppy and the wind rising, so my observer sent off his pigeon while I kept the machine head to wind.

'At about 2.30 my starboard lower plane was carried away causing us to swing broadside on to the sea: we climbed out on to the other plane so as to balance things, but the machine gradually got tail to wind and the tail plane was smashed and the machine gradually began to sink tail first. As she sank we climbed out on to the floats and sat on them, till I was washed off, but managed to catch the tail under water and climb on again. Here we sat till the machine sat up propeller in air and finally turned right over, leaving just the underneath part of each float out of the water.

'By this time the sea was very rough and the wind blowing a gale. We clung as best we could all night and when morning dawned, the wind had dropped considerably and the sea was getting quieter. We watched all day and by evening the sea was calm and we caught sight of a lightship and a cruiser and two destroyers in the distance, but we could not make them. About sunset six seaplanes, flying very low, and in diamond formation, flew over us as we waved to them and they answered by firing a green light, but they took no further notice. Their machines had our markings, but were going east and flying very fast.

'Nothing else happened till the Sunday when an

'aeroplane flew over, but failed to see us. The weather remained calm till on the Tuesday at about 2 'clock we sighted an H.12, which also saw us; it circled round coming lower and lower and finally landed, although the sea was getting rough again. As it passed us we hung on to the wires and climbed in. We tried to get it up again, but the water was too rough and we only broke our tail plane, so we taxied for about 25 miles till we sighted the *Orient* which took us aboard and later on transferred us to the *White Lilac* which brought us into Felixstowe at about 9.30 p.m. on Tuesday night. The signal code book we had with us was first torn up and then thrown into the sea, just before our machine turned over.'

Not often have words so bald been used to cover a tale of comparable endurance. All that the pilot and his observer had to eat during the five days and nights they were clinging to the float of the wrecked seaplane were a few malted milk tablets. One of the pigeons which were released was never seen again, but the other fell exhausted on the deck of a mine-sweeping trawler and, after being succoured, was released once more and eventually found its way to its loft at Westgate.¹ From the pilot's report it will be seen that about sunset on the 25th, that is on the second day, six seaplanes appeared over the castaways, answered their distress signals by firing a green light, and passed on without further action. As is told below, German aeroplanes bombed Folkestone in the late afternoon of the 25th, and many aircraft went up in pursuit. It is known also that German seaplanes from the Belgian coast stations were active. There is no record, however, of any British formation such as is described in the pilot's quoted report, and it is unlikely that the seaplanes were German. There are recorded instances when German pilots risked their lives to rescue British airmen in peril on the North Sea, but none when they callously left them to their fate.

¹ There is no record that any action was taken on receipt of the message. It was, apparently, on the third day that the pigeon flew in, and that so much time had elapsed, coupled with the fact that the weather was very misty, probably made it appear that a search would entail risk with no chance of success.

It is not impossible that the seaplanes were a phantom Flight, created from the stuff of the hopes and sufferings of the two airmen.

The story of the rescue maintains the note of drama. For some days fog had shrouded the East Coast air stations. About 11 a.m. on the 29th the mist at Felixstowe began to lift, and two flying-boats were ordered to be ready to make a routine patrol in search of German submarines. They left soon after midday, but they had not long gone out when the fog began to descend again. One of the flying-boat pilots turned back, but the other continued for a time until, beyond the North Hinder light vessel, the fog had become so dense that he decided to return. In this flying-boat were Flight Sub-Lieutenants J. L. Gordon and G. R. Hodgson, Leading Mechanic S. F. Anderson, and W/T Operator B. W. Millichamp. Through a break in the fog on the homeward journey, at 1.30 p.m., an object was sighted on the water twelve miles west of the North Hinder. The report of the two officers says: 'Came down to 600 ft., circled around, and observed it to be two people on upturned "Short" float. Then brought in aerial and descended to 50 ft. Flew directly over them and observed that they were urgently in need of assistance. Then ascended to 1,000 ft., wirelessly position and that we were about to land to pick up crew of wrecked plane. Also dropped three of the bombs: the fourth one hung up. Landed close by and on second attempt succeeded in getting pilot and observer aboard by taxiing directly up to them and catching them on drift wires close to nose of boat. Made two attempts to take off, but was unable to do so on account of heavy sea. On second attempt smashed tail plane and starboard wing float. Taxied 280° and picked up Inner Gabbard buoy at 4.10 p.m. Tail of boat was leaking badly and shipping considerable water over bows. Altered course to 300°. Made Channel 3 miles S. of Shipwash at 5.30 p.m. Tail of machine was full of water so made distress signal and was taken in tow by *Orient of Leith* which was bound for Yarmouth. Transferred 30 minutes later to two armed drifters. H.M.S. *White Lilac* took rescued pilot

'and observer aboard, also Flight Sub-Lieutenant Hodgson, 'Leading Mechanic Anderson, and Wireless Telegraphy 'Operator Millichamp, while H.M.S. *Maratina* took 'seaplane in tow, also Flight Sub-Lieutenant Gordon 'aboard. *White Lilac* arrived Felixstowe 9.30 p.m. '*Maratina* 12.30 a.m.'

The Daylight Aeroplane Raids¹

In 1917, up to the date of the Zeppelin raid on the 23rd/24th of May, there had been no more than spasmodic attacks by heavier-than-air craft. An aeroplane had bombed Broadstairs in the 1st of March, another Westgate on the 16th, another Dover on the 17th, and a seaplane had attacked Broadstairs again on the 5th of April. Soon after midnight on the 6th/7th of May an aeroplane had appeared over London and had dropped five bombs between Hackney and Holloway, but this attack, like the others, was of the 'tip-and-run' kind to which we had become accustomed. In the afternoon of the 25th of May, however, the day after the night-raiding Zeppelins had struggled homeward across the North Sea, a squadron of bombing aeroplanes appeared against the sky to create a new anxiety.

The story of the development of this bombing squadron must be told. It will be recalled that a military aeroplane unit, to be used for the bombing of England, had been formed near Ostend in November 1914.² The Germans hoped at the time that Calais would become available as a base from which the unit could operate, but as Calais was never captured, and because the technical qualities of the contemporary aeroplanes did not permit of effective operations being made against England from a Belgian base, the squadron had been moved to Metz in the spring of 1915. This squadron, which to conceal its purpose had originally been called the 'Ostend Carrier-Pigeon Squad-

¹ Information, from the German side, of the aeroplane attacks on England is contained in a series of authentic articles which appeared in *Die Luftwacht*, Nos. 5 to 8 (May to August), 1927. The author was Major Freiherr von Bülow. For a statistical summary of aeroplane raids 1917-18, see Appendix I, Table B.

² Vol. III, pp. 88-9.

'ron', served for a brief time on the Eastern front and then became the parent squadron of various units, including the 'Metz Carrier-Pigeon Squadron'. In July 1915 the 'Ostend Carrier-Pigeon Squadron' was reconstituted at its original aerodrome at Ghisteltes, the duties assigned to it being bombing, patrol work, and the provision of escorts for Zeppelins returning from attacks on England. In December 1915 the squadron was renamed Battle Squadron No. 1, and its establishment was laid down as six Flights of six aeroplanes each. It operated under the directions of German General Head-quarters (OHL)¹ which intended to use the squadron for attacks on England as soon as suitable aeroplanes became available, but in the heavy fighting on the Western front which took place in 1916 this intention was forgotten. Between February and June the squadron operated on the Verdun front and, during July and August, in the Somme area. At the end of August 1916, the squadron was reorganized. Half (Flights 1, 4, and 6) remained on the Somme front, while the remainder (Flights 2, 3, and 5) went to Romania and, later, appeared on the Salonika front. It was the half-squadron left behind on the Somme which, with picked personnel, ultimately became the *Englandgeschwader* (Bombing Squadron No. 3). The unit which went to Romania retained its identity as Bombing Squadron No. 1 up to the end of the war. It left the Salonika front for Belgium in May 1917 and began a bombing campaign against the Allied back areas on the Western front.

It was the production of the twin-engined Gotha (type G.IV) in the autumn of 1916, when the limitations of the Zeppelin as a raiding weapon were becoming clear, which brought the question of bombing England by aeroplane within the realm of practical discussion. The G.IV was a biplane of 75 feet wing span and 42 feet in length. It was fitted with two Mercedes engines of 260 horsepower driving pusher airscrews, carried a crew of three, and was armed with three machine guns, one of which could fire through a 'tunnel' to attack fighting aeroplanes

¹ The Squadron was usually known as *Bogohl 1*. (*Bombengeschwader Oberste Heeresleitung*.)

coming up under the tail. Six 50-kg. bombs could be carried, by day, and it was said that, so loaded, the Gotha had a ceiling of 18,000 feet, to which it could climb in one hour. Actually the greatest height reached, on the first daylight attack, was a little over 16,000 ft. Its speed was stated to be, in still air, about 80 miles per hour. For night attacks, when a lower ceiling, say about 10,000 feet, sufficed, a greater load of bombs, up to a total of about 500-kg., could be carried.

The general officer commanding the German military air service, in a memorandum issued in the autumn of 1916, said: 'Since an airship raid on London has become 'impossible, the air service is required to make a raid with 'aeroplanes as soon as practicable', and he went on to point out that thirty aeroplanes of the Gotha G.IV type would be ready by the 1st of February 1917. Eighteen aeroplanes could carry as great a weight of bombs as three airships, and, 'so far', he said, 'three airships have never reached London simultaneously'.¹

The preparations for the new campaign, which were very detailed, were covered by the code word *Türkenkreuz*. The squadron was commanded by Hauptmann Brandenburg and its aerodromes were at St. Denis Westrem (Flights 13 and 14) and Gontrode (Headquarters and Flights 15 and 16).² The squadron experienced difficulties in some of the details of preparation, which included liaison with the navy and with the Flanders naval air units, organization of a meteorological service and of a carrier-pigeon station, choice of targets, and the settlement of questions of formation flying, tactics, routes, maps, &c. There were other delays due to supply and technical troubles, but by the middle of May 1917 the squadron was at last ready to take advantage of the first favourable weather opportunity to begin its campaign.

Map 10 About 5 p.m. on the 25th of May the squadron, flying

¹ *Die Luftwacht*, May 1927.

² The designation of the squadron was changed from half-squadron No. 1 to Heavy Bomber Squadron No. 3 in March. Flights 1, 4, and 6 became 13, 14, and 15. Another Flight, 16, was formed at once, and the squadron was completed by two more Flights, 17 and 18, in July.

very high, crossed the coast of Essex between the estuaries of the Crouch and the Blackwater. It is of interest that many people thought, because of the loud hum of the engines, that Zeppelins were about, and some competent observers reported that they had seen one or two airships in company with the aeroplanes. There were dense clouds over Essex and observation was, therefore, difficult. It was because of the cloud banks that the squadron did not continue to London, which was the objective, but turned off instead across the Thames at Gravesend and, passing over Kent west of Maidstone and Ashford, went out at Folkestone about 6.30 p.m. The strength of the bombing squadron was twenty-one aeroplanes (from British observation at the time the number was put at a probable eighteen), and they were described as coming in 'more or less in a line'. After crossing the Thames they seem to have changed into some sort of group formation, and two groups, some distance apart, were confidently reported near Lympne. So far as can be stated 59 bombs of 50-kg. weight and 104 of 12-kg. were dropped, but 27 of the bombs failed to explode and a few others burst in the air. Shorncliffe and Folkestone which, for some unexplained reason, had received no warning of the presence of enemy aircraft over this country even though Dover had reported the approach of the bombers an hour and a half earlier, suffered most. Bombs on Shorncliffe camp and on Cheriton killed seventeen Canadian soldiers and wounded ninety-three, while the casualties at Folkestone were 16 men (one soldier), 31 women and 25 children killed, and 31 men (8 soldiers), 48 women, and 12 children injured. A majority of the casualties occurred in a crowded thoroughfare near the harbour (Tontine Street) where shoppers had congregated to make their Whitsun holiday purchases.¹ Houses

¹ The Chief Constable of Folkestone, in his evidence at the inquest on the victims of the raid, referring to his visit to Tontine Street, said: 'I saw 'an appalling sight which I shall never forget. Dead and injured persons 'were lying on the ground. Three or four horses were also lying dead 'between the shafts of vehicles, and fire had broken out in front of premises 'which had been demolished.'

and shops, two schools, and the Central Station were damaged. The total casualties for the raid were 95 killed and 195 injured.

There were many gallant, but mainly abortive attempts by pilots of the Royal Naval Air Service and of the Royal Flying Corps to intercept the raiders. Thirty-seven pilots from each service went up from various aerodromes, but few of them had aircraft capable of reaching the height at which the German squadron flew, nor was there any attempt at co-ordinated flying, and such encounters as there were were single-handed affairs. Flight Lieutenant R. F. S. Leslie from Dover pursued the Gothas over the Channel and fired 150 rounds into one of them before he was driven off. Fighting pilots from Dunkirk intercepted some of the raiders on the homeward journey and they reported that in the subsequent fighting they destroyed one Gotha and damaged another. According to German sources of information the losses were one Gotha destroyed in the Channel and another which, for some unknown reason, crashed in Belgium on its return. There is evidence also that one Gotha which made a safe landing had suffered damage by gun-fire.

This daylight attack revealed the utter inadequacy of the existing aeroplane defence measures. Deep feeling was aroused throughout the country, and protest meetings were held in Folkestone calling upon the Government to take steps to prevent a repetition of the attack.¹

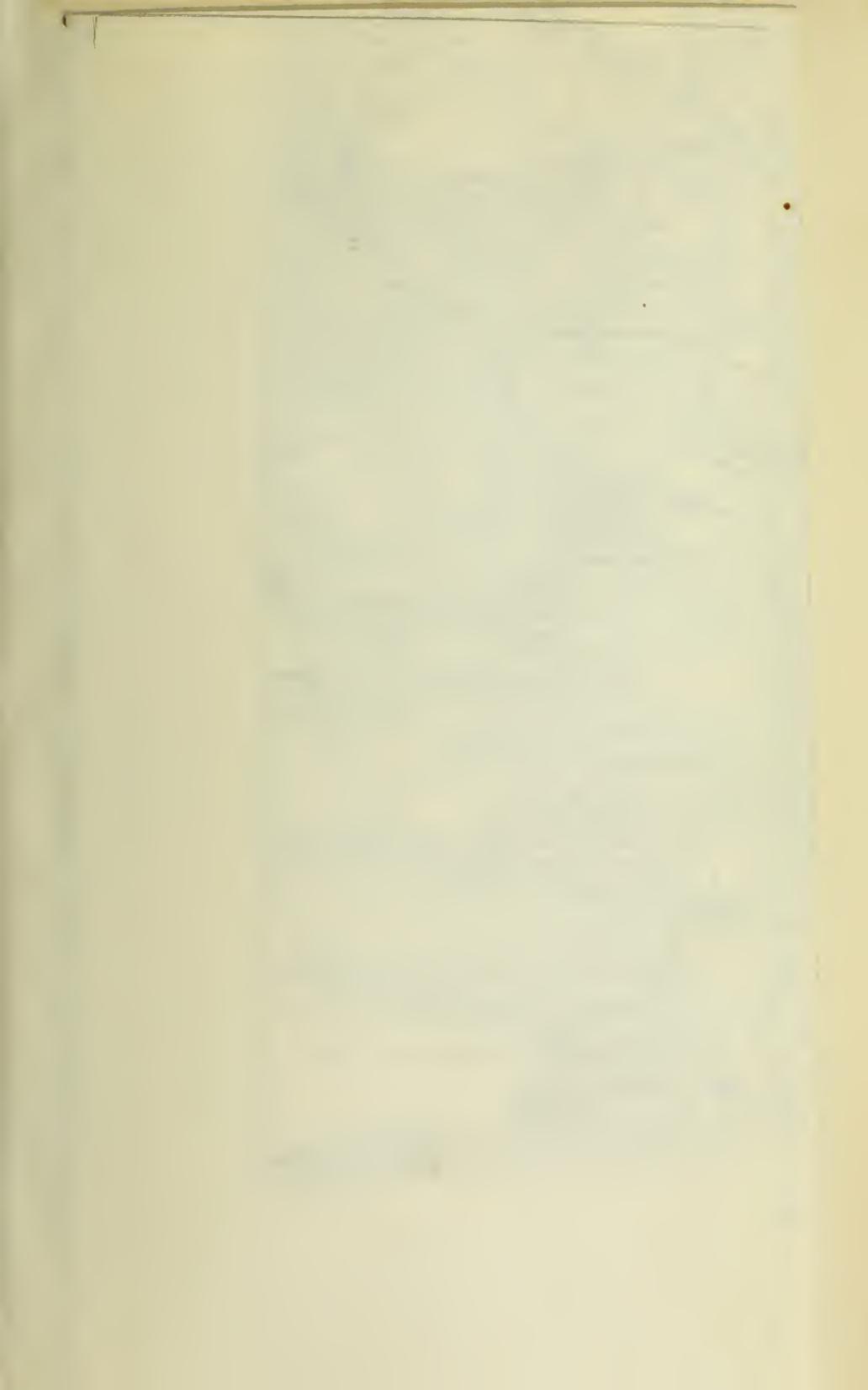
The Chief of the Imperial General Staff called a confer-

¹ The jury which sat upon the inquest of the Folkestone victims publicly expressed their regret that the competent authority did not give notice of the approach of the aircraft and recorded their opinion that in future the town should be warned of any such approach by siren or other device. A crowded meeting of townsmen unanimously passed the following resolution: 'The residents of the Borough of Folkestone demand that the Government be asked immediately to hold an inquiry into the air raid on Friday last, May 25th. We ask how it was possible for a large number of hostile aircraft to attack the town in broad daylight, inflicting appalling loss of life and damage to property, and if the military authorities had knowledge of an impending attack why no warning was given, so that people could return home and take cover: and that the Government be urged to take such steps as will prevent further attacks of a similar nature and the wholesale murder of women and children of the town.'

ence 'to consider and report upon the question of the 'defence of the United Kingdom against attack by aero-planes, with special reference to the measures necessary 'to secure effective co-operation between naval and 'military forces, the organization of communications, 'distribution of information and the allotment of air 'forces'. As a result of the conference it was concluded that, assuming a radius of action for the Gothas of 125 miles, the vulnerable area was bounded by the coast line from Southwold to Rottingdean, and by a line connecting the two places through Bury St. Edmunds and Brentford. The report of the conference recommended that the distribution of information about the movements of hostile aeroplanes should be speeded up, that trained anti-aircraft observers should be employed on lightships, and that the aeroplane patrol east of Woolwich should be strengthened. As a result, twenty-four non-commissioned officers and men were withdrawn from anti-aircraft batteries in France and were distributed among seven lightships in the Thames Estuary and off the East Coast. They were dressed in the same uniforms as the lightships' crews and had orders to convey information by telephone. It was stated in the report of the conference that at the time of the daylight raid no more than twenty-two regular defence aeroplanes were available in the area attacked, but that arrangements were being made to reinforce the aeroplanes within the vulnerable area. Squadrons of the Training Brigade were being moved into the area, and, in addition, Orfordness and Martlesham Heath Experimental Stations were being organized for the protection of Essex north of the river Blackwater. A point raised at the conference by Sir David Henderson, director-general of military aeronautics, deserves notice. He was of the opinion, he stated, that the question of communicating with pilots in the air by wireless should be considered, more particularly as ground signals had proved ineffective. He was precluded from making experiments or training personnel because the Admiralty objected that the use of wireless for this purpose might jam the Fleet communications. The Admiralty representatives

at the conference upheld this objection, but it was eventually decided that the question should be deferred for separate discussion.

The conference, in spite of its wide terms of reference, did not go very far towards improving what was, from any point of view, an unsatisfactory state of affairs. Nor was the problem of defence against night attacks, whether by Zeppelins or aeroplanes, in any better state. Two night-flying squadrons were to be formed in July (No. 101) and August (No. 102) for service in France, and Colonel T. C. R. Higgins, commanding the Home Defence Group, pointed out in a letter to the director of air organization, on the 1st of June, some of the effects. He stated that since the 1st of February 1917, 77 trained night-flying pilots had been withdrawn from the Home Defence Group, leaving only 107 trained pilots as compared with an establishment of 198. Furthermore, there had been for some time a deficiency of one-third in various important trades, and, although men had recently been posted to the squadrons, there had been little time to train them. If 420 trained men were taken away in July and August to form Nos. 101 and 102 Squadrons, there would be a reduced proportion of trained mechanics in all home-defence squadrons. To give time for officers and men to be trained, so that the duties of the Home Defence Group might be continued with reasonable efficiency, Colonel Higgins stated his opinion that the formation of No. 101 Squadron should be postponed until August and of No. 102 until October. Lord French forwarded a copy of this letter to the Secretary, War Office, and, in a covering letter dated the 5th of June, stated that the further depletion of the home-defence squadrons would place the aeroplane defence of the United Kingdom in a still more unsatisfactory position than it was when he made representations on the subject on the 20th of March. 'The impracticability', he said, 'of securing adequate aeroplane home defence by relying on such machines and pilots as happen to be at any given time available at Training Squadrons was recognized by the formation of the Home Defence Wing over a year ago. Various demands have



DAYLIGHT AEROPLANE ATTACK ON LONDON,
13th JUNE, 1917.

Approximate position of Exploded bombs ●
" " " Unexploded ○

WEATHER :
Fine, with some cloud and much haze.

STRENGTH OF RAIDING SQUADRON :
18 Gotha aeroplanes, of which 14 attacked London.

BOMBS : 118.
(In addition, 5 bombs were dropped on Mergate and 5 on Shoeburyness).

CASUALTIES :
162 killed, 426 injured.
(In addition, 4 were injured at Mergate and 2 injured at Shoeburyness).

MONETARY DAMAGE : £129,498.



Scale - Three Inches to One Mile - 2 1/2"
0 20 40 60 80 100 120 140 160
0 1/4 1/2 1 1 1/2 2 Miles

'been, and are being made for the supply of machines, pilots, and other personnel from the Home Defence Squadrons for overseas, and the object with which the Home Defence Wing was originally constituted appears 'in danger of being lost sight of.' He went on to say that there were only 75 aeroplanes available for night flying, and ended: 'I cannot too strongly impress on the Army Council my opinion that the means placed at my disposal for aeroplane defence are now inadequate and that a continuance of the present policy may have disastrous results.'

On the day that Lord French wrote his letter the German bombing squadron effectively reinforced a part of his argument. About 6.5 p.m. on the 5th of June twenty-two Gothas came in along the same route as on the 25th of May, but, instead of making towards London, they turned south and attacked Shoeburyness and Sheerness and places in the neighbourhood. At the former town about 27 bombs were dropped, but most of them fell on the beach or on waste land while a few exploded in the air; the casualties were two soldiers killed. At Sheerness the bombing was much more severe in its effect. Although the attack on the town lasted no more than five minutes, it resulted in the death of 11 people (only three of them civilians) and in injury to 34 (25 soldiers). The material damage was not heavy, but this was mainly because bombs which hit important targets failed to explode. Eight anti-aircraft guns (3-inch 20 cwt.) at Sheerness and Shoeburyness fired 504 rounds of ammunition and one of the Gothas was, as a result, shot down in the sea north of Barton's Point. Two prisoners were taken off the Gotha, which sank, but was afterwards raised. Sixty-six pilots went up in England to fight the raiders and five got near enough to deliver brief but ineffective attacks. As the Gothas approached Belgium on their return they were intercepted by ten naval pilots from Dunkirk and there was a running fight during which it seemed as though two of the bombers crashed, but the German records make no reference to losses other than the one Gotha destroyed near Barton's Point. *Map 10*

*The First Daylight Attack on London*¹

An important result of the above attack was the cancellation, made verbally on the 7th of June, of the order of the 7th of March which prohibited anti-aircraft guns, outside specified coastal areas, from opening fire on enemy aeroplanes. The scheme of gun-fire, prepared by the Anti-Aircraft Defence Commander in anticipation that the order might be cancelled, was at once issued, in time to be used during the first of the daylight attacks on London. The morning of Wednesday the 13th of June was fine, but there was a fair amount of haze. At 10.43 a.m. a hostile aeroplane was seen approaching Margate and, within a few minutes, had passed across the town and had dropped five bombs, two of which failed to explode: the others injured four civilians, but caused only slight damage. Meanwhile the main formation, from which the Margate raider had detached itself, had continued across the Thames Estuary, and at 10.50 a.m. approached Foulness Island. At that place three more aeroplanes appear to have left the main formation, and these shaped course for Shoeburyness, where two of them dropped six bombs which slightly injured two civilians but caused no damage.² The third flew up the Thames to Greenwich. The main body of the raiders, numbering fourteen Gothas, after making the mouth of the Crouch at 10.50 a.m., steered a direct course for London. The noise of their engines was heard in many places ten minutes before the aeroplanes came in sight. The formation kept during the approach to London was of a diamond shape with three Gothas forming a point in front and three similarly disposed in rear (see diagram, p. 27). The attack on the capital began at 11.35 a.m.³ and the full details of the bombs dropped and of the casualties and damage they caused will be found in Appendix III.⁴ The

¹ For statistics of raids on the County of London, 1917-18, see Appendix II.

² Bülow says that four Gothas turned back with engine trouble. It was one of these which attacked Margate.

³ The order *Take Air Raid Action* was given to District 48 (London) at 11.21 a.m.

⁴ See also map, p. 25.

first group of bombs fell between East Ham and the Royal Albert Docks, the second group in the city with Liverpool Street station as the central point, a third in Southwark, and a fourth in Dalston. The raiders appear to have begun bombing in two separate formations which converged for the main attack on the City, where, in two minutes,



seventy-two bombs fell within a radius of a mile from Liverpool Street station. The total casualties were 162 killed and 432 injured, the greatest inflicted in any one bombing attack on England during the war.¹ The most tragic happening of the morning took place in Upper North Street Schools at Poplar. A bomb of 50-kg. weight passed through the roof and three floors of the school to the ground floor. In its passage through the building, during which two children were killed, half of the bomb was torn away, but the remainder exploded among 64 children. Sixteen of them were killed and thirty more, together with two men and two women, were injured. Another bomb, of similar weight, which passed through the five floors of the Cowper Street Foundation School, City Road, failed to explode.

The German leader of the raid, Hauptmann Brandenburg, in his report of the attack says: 'London was reached 'by seventeen aeroplanes. The visibility was exceptionally 'good. With perfect clearness, the Thames Bridges, the 'railway stations, the city, even the Bank of England,

¹ A police return shows that of the 59 persons killed and 95 injured within the City of London, 25 were killed and 41 injured in the streets.

'could be recognized. The anti-aircraft fire over London 'was not particularly strong and was badly directed. Many 'enemy fighting aeroplanes had, meanwhile, nearly reached 'the height of the squadron. In all, sixteen enemy aircraft, 'which flew independently, were counted. The number 'which ascended may be rightly estimated about thirty. 'Only one of them attacked. Our aircraft circled round 'and dropped their bombs with no hurry or trouble. 'According to our observation, a station in the City, and 'a Thames bridge, probably Tower Bridge, were hit. Of 'all our bombs it can be said that the majority fell among 'the Docks, and among the city warehouses. The effect 'must have been great. After the bombs had been thrown 'the squadron closed formation again. The aeroplanes, 'lightened of the loads, flew well, and the pursuing enemy 'aircraft gave up at the coast. All the aeroplanes landed 'safely on their aerodrome.'¹

Seaplanes and aeroplanes went up from coast stations, from acceptance parks, depots, experimental stations, and training squadrons, as well as from the home defence squadrons. In all, 92 pilots ascended in England, but they flew as individuals. Most of them never saw the enemy, but a few got within firing range and attacked unhesitatingly. Captain C. H. C. Keevil, the observer in a Bristol Fighter of No. 35 Training Squadron which abortively attacked three Gothas 'straggling over Ilford', was killed during the combat.

This raid stirred the country. The main feeling was one of indignation. Innumerable people had been attracted to their doors and gardens and into the streets on that pleasant morning to see what concourse of aircraft was making such an impressive noise. Many of the spectators had watched the passage of the German squadron and had turned to look at other aeroplanes climbing upwards in various quarters of the sky, curious to know what the bother was about. At first they had had no thought, or if a doubt touched their minds they dismissed it as absurd, that this might be an enemy bombing formation. But afterwards they had heard the bursting of anti-aircraft

¹ Quoted in *Deutschlands Krieg in der Luft* (Hoepfner), pp. 111-12.

shells, the occasional rattle of machine-gun fire in the air, and, great numbers of them, the explosion of the bombs.

The War Cabinet met the same afternoon to consider the reports of the raid, and again the following day to discuss the details of the action which should be taken. At the second meeting the Chief of the Imperial General Staff urged that there should be a large-scale increase in the number of our aeroplanes, even at the expense of other weapons. The War Cabinet agreed with Sir William Robertson, in principle, and decided that the departments concerned should confer together to draw up a scheme for the expansion of the air services. Various memoranda were prepared, and after the preliminaries had been explored departmentally, a general conference was held at the War Office, under the chairmanship of Lord Derby, on the 21st of June. Lord Derby began by saying that the War Office proposed to double the Royal Flying Corps, even if it proved necessary in consequence to reduce the supply of tanks and of motor transport. The conference discussed this proposition and contingent matters, and the statement of the decisions reached was considered by the War Cabinet on the 2nd of July. In the scheme put forward sanction was asked 'for an increase to commence at once, of the establishment of the Royal Flying Corps from 108 to 200 service squadrons, with the necessary aerodromes and establishment, and for a progressive increase in the output of aero engines to 4,500 a month, including certain supplies from overseas'. The scheme was approved by the War Cabinet, and the approval noted also that there should be a 'corresponding expansion and increase of the Royal Naval Air Service'.

This decision of the Government that the air services must be doubled was one of outstanding importance which was to have many repercussions. Meanwhile, as a temporary measure, the War Cabinet discussed the desirability of making a raid on some town in Germany such as Mannheim, and of bringing fighting squadrons over from the Western front to give the bombers, if they came again, a warm reception which would take them by surprise. It happened that Sir Douglas Haig was about to pay a visit

home to talk over with the Government his plans for the Flanders offensive. He was informed, on the 15th of June, that the subject of the air raids on London would also come up for discussion, and he therefore asked Major-General Trenchard to put forward the views of the Royal Flying Corps. These were set out in a memorandum dated the 15th of June and, next day, a General Headquarters memorandum, based on that of Major-General Trenchard, was prepared as follows:¹

‘1. The capture by us of the Belgian coast would be ‘the most effective step of all, as, in addition to increasing ‘the distance to be traversed, it would force the German ‘machines either to cross territory occupied by us—when ‘going and returning—a considerable advantage to us— ‘or to cross neutral territory, where our Secret Service ‘could doubtless establish means of giving us warning ‘quickly.

‘2. The next most effective step is to inflict the utmost ‘damage on the enemy’s sheds and machines behind his ‘Western front. Much has been done in this way. The ‘amount which can be done is limited by the number and ‘capacity of machines and pilots available in France. ‘Increased activity on the Western front serves the double ‘purpose of assisting the Armies in overcoming the enemy ‘and at the same time reducing his power to send expedi- ‘tions to England. To the Germans this reply would be ‘most disappointing.

‘3. Any system of patrols would entail the use of a ‘great number of machines and pilots. To justify any ‘hope of such a system being effective (except by sheer ‘luck) the number of machines and pilots required would ‘be entirely beyond our present power of supply. The ‘great object the enemy has in view is undoubtedly to ‘weaken us in France, and if we adopt a patrol system we ‘play his game.

‘4. As a temporary measure a modified system of patrols ‘might be tried, working on both sides of the Channel. ‘To give this its best chance of success an extensive system

¹ Major-General Trenchard’s original memorandum is, as a matter of interest, reprinted as Appendix IV.

'of communications, by wireless and other means, would
'be required; and it is essential that there should be unity
'of command over the whole system of patrols and com-
'munications. A competent officer could be supplied from
'France for a short period, but both he and machines and
'pilots sent from France will be urgently required to be
'back there by the 5th July.

'5. Reprisals on open towns are repugnant to British
'ideas, but we may be forced to adopt them. It would be
'worse than useless to do so, however, unless we are
'determined that, once adopted, they will be carried
'through to the end. The enemy would almost certainly
'reply "in kind" and unless we are determined and prepared
'to go one better than the Germans, whatever they may
'do and whether their reply is in the air, or against our
'prisoners, or otherwise, it will be infinitely better not
'to attempt reprisals at all. At present we are not prepared
'to carry out reprisals effectively, being unprovided with
'suitable machines. If we decide to provide the necessary
'machines and to adopt the system, we might do good by
'sending out machines now to drop notices in selected
'German towns warning them of our intention if the raids
'on our open towns continue, and pointing out that their
'towns are within our reach. We should not do this,
'however, unless we intend, and are able, to keep our
'word. We might, however, drop notices pointing out
'that they are mistaken in thinking they are not within
'our reach, and although we have heretofore refrained
'from the brutalities of which their Government has been
'guilty it is not owing to lack of power to exact reprisals.'

Sir Douglas Haig paid his visit to London on the 17th of June and, at the special request of the Government, he was accompanied by Major-General Trenchard. They attended a meeting of the Cabinet committee on war policy on the 20th and, verbally, reinforced the views set out in the memorandum. As a result the Government decided to adopt the suggestion that fighting patrols be tried temporarily on both sides of the Dover Straits. Sir Douglas Haig was instructed to send one squadron home from France and to move another to Calais. No.

56 (S.E.5) Squadron flew to Bekesbourne, near Canterbury, on the 21st of June, and No. 66 (Sopwith 'Pup') Squadron to Calais. These squadrons were withdrawn from the General Head-quarters Wing in France and their absence was markedly felt.¹ On the 5th and 6th of July, after an uneventful fortnight, the squadrons rejoined the British Expeditionary Force: within some hours of their arrival on their aerodromes in France twenty-two German bombers were flying over London.

A Zeppelin Interlude

Map 3 Meanwhile there had been two minor attacks on the eastern counties, one by airships and one by aeroplanes. In the afternoon of the 16th of June, four Zeppelins left the north German sheds to bomb England. Owing to the shortness of the night, with no more than four hours of darkness, it was obvious that the airships under the most favourable conditions would be unable to penetrate very far inland. It happened that they encountered head winds, and only two crossed the coast. The *L.42* (Kapitän-leutnant Martin Dietrich) came in over the North Foreland at 2.5 a.m. and bombed Ramsgate, Manston, and Garlinge. The third bomb from the airship exploded a naval ammunition store near the Clock Tower in Ramsgate Harbour and great military damage was caused.² The buildings of the naval base were destroyed and many thousands of windows throughout the town were shattered by the series of explosions. Two men and a woman were killed and seven men, seven women, and two children were injured. Of the seven men injured, one was a naval rating, one a Lieutenant, Royal Flying Corps, and one a policeman. It is of interest that the underside of the *L.42* was painted black and she could be seen only faintly when held in the beams of the searchlights. One of the many naval pilots who ascended, Flight Sub-Lieutenant G. H. Bittles, in a seaplane, engaged her at

¹ See Vol. IV, pp. 134-5.

² The bomb was of 660-lb. weight. Dietrich, in his report, says it caused a giant explosion which was later followed by other explosions. He was under the impression that his attack was made on Dover.

11,000 feet when she was thirty miles east of Lowestoft, but her nose went up rapidly and the seaplane was soon outdistanced. Flight Lieutenant E. Cadbury, in a Sopwith 'Pup', would possibly have claimed the *L.42* as a victim if he had not had bad luck. As she climbed away from the seaplane, Flight Lieutenant Cadbury was gaining height and he caught up with her at 15,000 feet and at once attacked. Dietrich knew that his only hope was to go still higher and he climbed on, unaware that the pursuing aeroplane was a Sopwith 'Pup' which was capable of overtaking him. At the critical moment, however, the 'Pup' refused to climb because of a petrol-pipe fracture, and the *L.42*, at 16,000 feet, found herself alone and out of harm's way and, although a flying-boat took up the chase and followed her for ninety minutes, she had no difficulty in maintaining her lead.

The *L.48* (Kapitänleutnant Eichler), the flagship of the raiding squadron, in which was travelling Korvettenkapitän Victor Schütze, the commodore of the North Sea airship division, was first seen about forty miles north-east of Harwich at 11.34 p.m. She cruised about for some time and it was not until 2 a.m. that she crossed the coast south of Orfordness. After circling over Suffolk, apparently trying to pick up her bearings, she bore down on Harwich, but was turned back across the river Deben by accurate anti-aircraft gun-fire, and she then made off north-eastwards. The night was exceptionally clear, and although the height of the *L.48* when she was near Harwich was estimated at 16,000 feet, she could be seen as she moved across the sky. At 3.28 a.m. at Theberton, north-east of Saxmundham, she met her end. She was attacked simultaneously by Captain R. H. M. S. Saundby, Royal Flying Corps, in a D.H.2 of the Orfordness Experimental Station, and by Lieutenant L. P. Watkins, Canadian Army attached to No. 37 Home Defence Squadron, in a B.E.12. The final blow was delivered by the latter officer and the *L.48*, in flames, descended slowly into a field at Holly Tree Farm.¹

¹ The report of Lieutenant Watkins reads: 'On the morning of the 17th June 1917 I was told by Major Hargrave there was a Zeppelin in

The second in command of the airship, Leutnant zur See Mieth, gravely hurt, was rescued from the blazing ship by a local constable, and two men, one of them seriously injured, were also rescued. Kapitänleutnant Eichler had jumped from the burning ship with four of his crew, and they had been killed instantly. Leutnant Mieth stated that between 12.30 a.m. and 2 a.m. the *L.48* had been out of action because of engine trouble, and he further stated that the ship had not, as had been thought, been hit by anti-aircraft gun-fire near Harwich. A tribute must be paid to the bravery and persistence of the commander and of his crew who, in spite of engine trouble, and the clear visibility which favoured the defence, endeavoured to fulfil their orders and gave their lives in the attempt.¹ About twenty-four bombs came from the *L.48* during her passage over Suffolk, but they fell in fields and did no damage.

The Daylight Campaign Resumed

There was quiet over England until the 4th of July, when the German bombing squadron made a brief appearance at Harwich. At 6.55 a.m. sounds of aircraft were heard out to sea from Orfordness and, five minutes later, the bombing squadron, about eighteen strong, crossed at Shingle Street. It happened that Captain J. Palethorpe, Royal Flying Corps, from the testing

‘the vicinity of Harwich, and was ordered to go up on B.E.12. 6610. I climbed to 8,000 feet over the aerodrome, then struck off in the direction of Harwich still climbing when at 11,000 feet over Harwich I saw the A.A. guns firing and several searchlights pointing towards the same spot. A minute later I observed the Zeppelin about 2,000 feet above me. After climbing about 500 feet I fired one drum into its tail, but it took no effect. I then climbed to 12,000 feet and fired another drum into its tail without any effect. I then decided to wait until I was at close range before firing another drum; I then climbed steadily until I reached 13,200 feet and was then about 500 feet under the Zeppelin. I fired three short bursts of about 7 rounds and then the remainder of the drum. The Zeppelin burst into flames at the tail, the fire running along both sides; the whole Zeppelin caught fire and fell burning.’

¹ It was over the grave of the crew of the *L.48* that the Royal Flying Corps had inscribed the text: ‘Who art thou that judgest another man’s servant. To his own master he standeth or falleth.’

squadron at Martlesham Heath, was in the air in a D.H.4 when the German squadron appeared. He attacked at once, but his passenger, Air Mechanic J. O. Jessop, was shot through the heart, and the pilot had to break off the fight and land. The bombing formation, which had, meanwhile, altered course, steered for Felixstowe, where it seems to have divided into two detachments, one of which attacked Felixstowe and the other Harwich. The clouds, however, were thick, and the movements of the raiders were difficult to follow. According to our estimates sixty-five bombs were dropped and twenty-three of them fell in the water in Harwich Harbour, off Dovercourt, and off Felixstowe. Harwich suffered no damage, but at the Royal Naval Air Station at Felixstowe, where only two 12-kg. bombs fell, the damage was considerable. Six naval ratings and three civilian workmen were killed and eighteen ratings and one workman injured. A flying-boat was destroyed by fire and another damaged, and the telephone system was put out of action. Two bombs, also of 12-kg. weight, which fell near a camp of the 3rd Suffolks, killed five soldiers and wounded ten. Four more bombs, dropped near the balloon station at Shotley, inflicted no damage, but killed three naval ratings.

The anti-aircraft guns of the Harwich defences were in action for nineteen minutes and fired 135 rounds, but the target was a difficult one and no hits were made. As the bombing squadron did not come inland the task of the defence pilots was almost hopeless, and none of the eighty-three who ascended from various squadrons and parks in Essex found the enemy. For an attack of this kind the air stations on the north French coast were better placed than those in England for interception of the raiders. No. 66 Squadron, waiting at Calais for just such an opportunity, was, through some unexplained muddle in communications, kept on the ground while the German bombing formation was making its way home within easy distance. When the warning did reach the squadron eighteen aeroplanes were sent away, at 8.20 a.m., but it was then too late and the pilots searched in vain until they were compelled to turn back by bad weather. Twenty

naval pilots from Dunkirk were in the air some time before those of No. 66 Squadron, and five of them, in Sopwith 'Camels', found and attacked sixteen bombers about 8.30 a.m. They reported that they had shot one down in flames, but the German records do not show any Gothas lost on this day.

Then, on Saturday the 7th of July, after Nos. 56 and 66 Squadrons had rejoined the Royal Flying Corps in the field, came the second daylight attack on London. The morning was fine with a layer of stratus cloud high above London and a somewhat hazy atmosphere. The enemy bombers were first located well out to sea at 9.14 a.m. About fifteen minutes later one Gotha dropped three bombs on Margate, one of which wrecked two houses, killing two women and a man, and injuring two women and a child. It was thought at the time that the attack on Margate had possibly been made as a diversion to draw the attention of the defence aeroplanes away from the main formation, but it is now known that the bombing was done by a Gotha which had developed defects and had turned for home. The main squadron, numbering twenty-one, crossed the coast near the mouth of the Crouch about 9.45 a.m., in diamond formation, and, dogged by anti-aircraft gun-fire, kept a course direct for London. They came into the capital from the north and north-west and, clearly outlined to the people in the streets and at their windows, passed across the City and the East End, dropping bombs as they went. The total casualties were 54 killed and 190 injured, including 10 killed and 55 injured by anti-aircraft gun-fire, as set out, with the damage caused, in Appendix V.¹

The raid once again demonstrated the futility of an unorganized defence. Seventy-eight pilots of the Royal Flying Corps and seventeen from the Royal Naval Air Service took the air from home defence and training squadrons, from acceptance parks, and from coast stations. The aeroplanes flown by the Flying Corps pilots were of twenty-one types, many of them of little fighting value, but thirty were efficient contemporary fighters ('Camels',

¹ See also map facing.

DAYLIGHT AEROPLANE ATTACK ON LONDON,
7TH JULY, 1917.

No. 12

Approximate position of Exploded bombs ●
" " " Unexploded " ○

WEATHER :

Light easterly wind. Very little cloud.

STRENGTH OF RAIDING SQUADRON :

22 Gotha aeroplanes.

BOMBS : 65.

(In addition, 4 bombs were dropped near Tottenham gasworks, 2 near Ferry Road, Edmonton, one in a field at Chingford, one at Ponders End sewage farm and 3 on Margate).

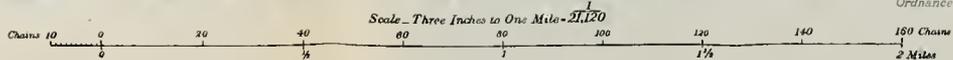
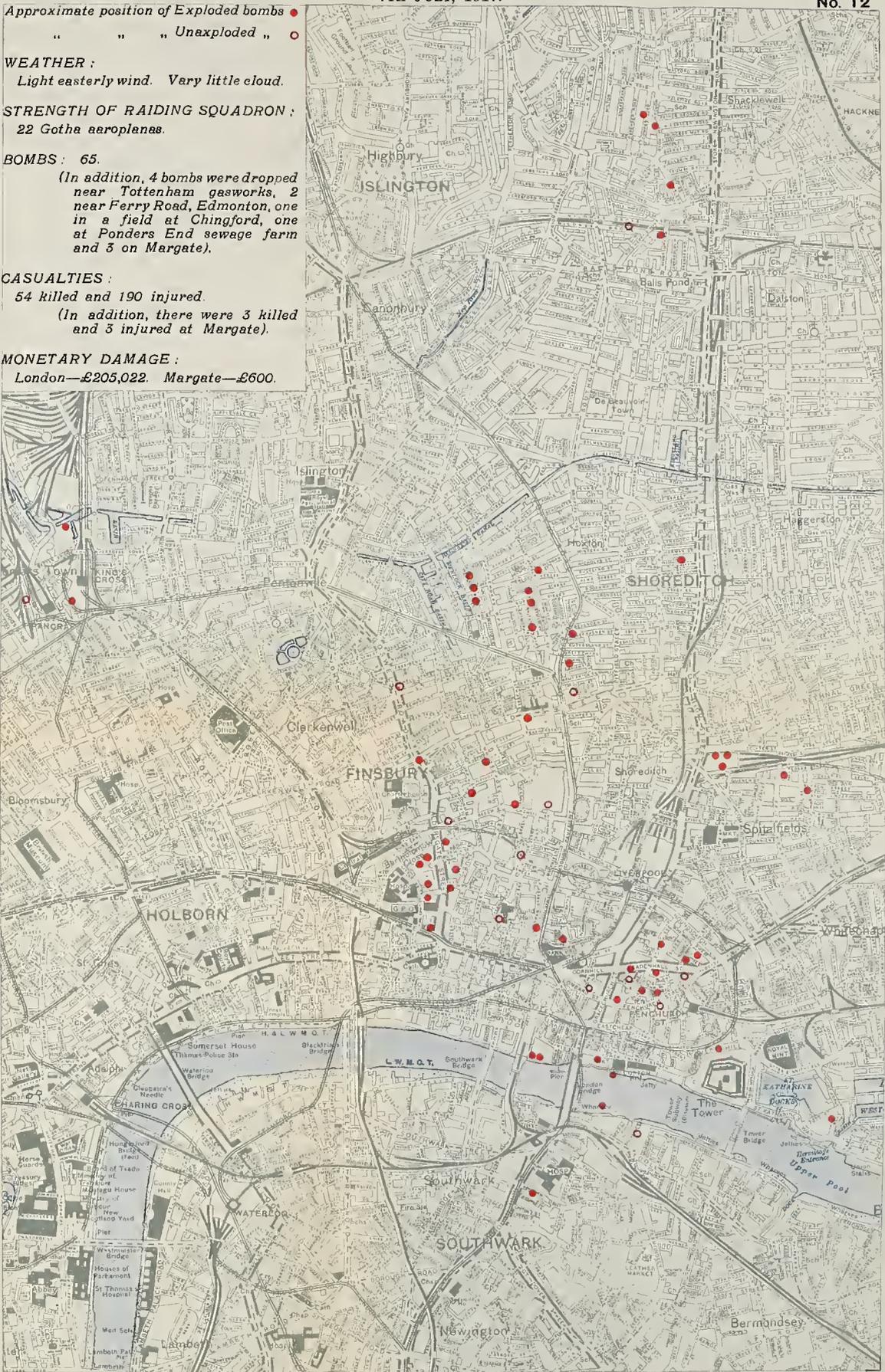
CASUALTIES :

54 killed and 190 injured.

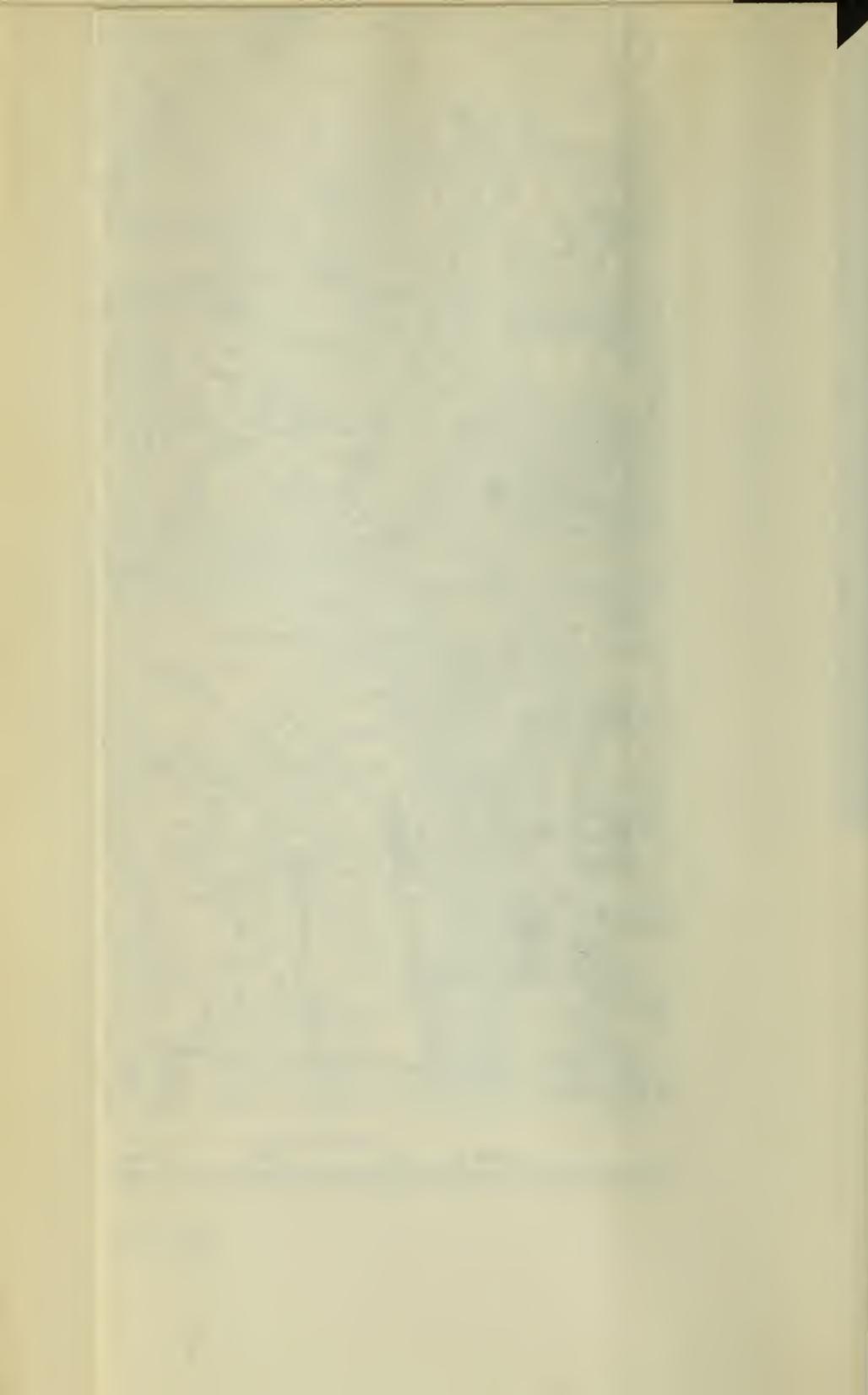
(In addition, there were 3 killed and 3 injured at Margate).

MONETARY DAMAGE :

London—£205,022. Margate—£600.



Ordnance Survey 1931.



S.E.5a's, 'Pups', Bristol Fighters, &c.). They ascended, however, from all points of the compass and attacked individually. Of gallantry there was no lack and, in all, thirty-six pilots got close enough at various times to attack the Gothas. Two naval pilots, in Sopwith 'Camels', engaged them at close range over Chingford, but were both forced to break off the combat because of machine-gun trouble. A Sopwith two-seater of No. 37 Home Defence Squadron which fought the bombers as they came in was shot down, the pilot, Lieutenant J. E. R. Young, being killed, and the observer, Air Mechanic C. C. Taylor, wounded. Captain J. Palethorpe, in a D.H.4, intercepted the enemy formation on its return and persistently attacked the leader,¹ but he received a wound in the hip and was forced to break off the combat and land. Another pilot, Second Lieutenant W. G. Salmon, of No. 63 Training Squadron, in a Sopwith 'Pup', who unhesitatingly attacked the bombing formation single-handed, was killed in combat. One of the Gothas was found, flying low down near the North Foreland apparently in trouble, by an Armstrong-Whitworth two-seater of No. 50 Home Defence Squadron and was shot down in the sea. Two of the crew climbed on the wings as the Gotha lay on the water, and the British pilot, Second Lieutenant F. A. D. Grace (observer, Second Lieutenant G. Murray) fired all his Very lights in the hope that he would attract attention to the plight of the enemy. He could not stay in the neighbourhood owing to shortage of petrol, and when the area was searched later there was no sign of the Gotha or its occupants. Four naval pilots from Manston had separate combats over the sea and each thought that the engagement had been successful, but the Germans record a loss of only one Gotha shot down in air combat. Four others crashed on landing, the result it is stated of a high wind, and one of them was destroyed by fire. Pilots from Dunkirk had a number of combats with enemy aircraft

¹ The leader in this attack was Hauptmann Kleine who had taken over from Hauptmann Brandenburg, out of action through a leg broken in a crash. Kleine was killed on the Western front in December 1917, and Brandenburg then resumed command.

probably sent up to act as escorts for the returning bombers, but none with the Gothas themselves.

This second daring attack on the heart of London created a tense atmosphere. The population of the capital and of the whole of the southern part of the country was deeply roused. The general view was that it was intolerable that the enemy should be allowed to come and go almost with impunity. Had the attacks taken place at night the public would, no doubt, have made allowances for those responsible for the defence, and would have been prepared to exercise patience while the defence measures were reorganized. But the enemy had flown unimpeded across England in the full light of day for the second time in a few weeks, and for that the public could find no excuse. A special Cabinet meeting was held on the Saturday afternoon and the view was then expressed that, in the prevailing state of the war, the issue depended as much on the endurance of the people as on that of the armies. Sir William Robertson has recorded that at this meeting much excitement was shown ('one would have 'thought the whole world was coming to an end').¹ Two methods to stop the raids were discussed, namely, (i) the maintenance of an efficient force of aircraft in England to repel attacks, and (ii) counter-attacks on German towns, such as Mannheim. It was decided that the War Office should allot a squadron, in process of formation for service in France, to home defence; that Sir Douglas Haig should be ordered to send two good fighting squadrons to England until the War Cabinet sanctioned their return; and that he should be informed that an attack on Mannheim was desirable if it would not upset his plans.² Sir Douglas Haig, on receipt of these instructions, replied at once by telegram: 'Two good fighting squadrons will proceed to England to-morrow as ordered. Request following facts 'may be laid before War Cabinet at once in connection 'with this decision. Fight for air supremacy preparatory to 'forthcoming operations was definitely commenced by us 'this morning. Both enemy and ourselves have concentrated 'fighting machines for this struggle in the air which will

¹ *Soldiers and Statesmen*, Vol. II, p. 17. ² See also Vol. IV, pp. 152-5.

'undoubtedly be the most severe we have yet had. Success 'in this struggle is essential to success of our operations. 'Withdrawal of these two squadrons will certainly delay 'favourable decision in the air and render our victory 'more difficult and more costly in aeroplanes and pilots. 'If raid on Mannheim is undertaken in addition our plans 'will have to be reconsidered entirely and the operations 'may have to be abandoned.'

This telegram impelled the Government to reconsider the question at their meeting on Monday the 9th, and, after much discussion, it was decided that only one squadron need be transferred to England from France, and that the project to raid Mannheim should be postponed until efficient bombing aircraft became available. No. 46 (Sopwith 'Pup') Squadron left France for Sutton's Farm, Essex, on the 10th of July.

Additional light is thrown on these happenings by Sir William Robertson, who quotes a letter he wrote to Sir Douglas Haig on the 9th of July. Beginning with the Cabinet meeting which met on the Saturday of the raid, he says: 'I could not get in a word edgewise. French was 'there and gave a long story as to his insufficient forces, 'and made a great protest because the two squadrons you 'had lent him were taken away. In spite of all I could say 'the decision come to was that you were to send two 'squadrons to England until the Cabinet choose to release 'them. There is no doubt that French has not got a very 'good force. It is mainly made up of oddments, and of 'course oddments will not do. When we received your wire 'yesterday the Cabinet were inclined to go back on their 'decision, and agree to ask you for less than two squadrons 'and perhaps for none. To-day they had another meeting, 'at which French was again present, and the old ground 'was re-traversed. The result was that you have now to 'send back one squadron in place of two. I am afraid I 'cannot say when the squadron will be returned. Of course 'it is necessary that these raids should be put an end to, or 'at any rate be severely punished. We saw Saturday's 'raid from the War Office windows. Our anti-aircraft 'artillery was apparently of no use, and our airmen arrived

'in dribbles and were powerless, but succeeded in getting 'one machine down. The fact is we have not got enough 'machines to meet our requirements. I find that I have 'brought the question before the Cabinet no fewer than 'six times during the present year. I doubt if any real 'progress will be made until a different organization is 'established. The Army and Navy now say what they 'want, the Air Board consider their wants, and then 'Addison [Minister of Munitions] makes the machines. I 'am inclined to think that we need a separate air service, 'but that would be a big business. There is a special debate 'on the subject to-night, and it will probably be followed 'by a secret session.'¹

At the War Cabinet meeting on the Monday, referred to by Sir William Robertson, there had indeed been much liveliness. Lord French had read a letter which he had addressed to the Secretary of the War Office on the 2nd of July in which he had stated that the withdrawal of the two fighting squadrons, on loan from Sir Douglas Haig, would leave wholly inadequate forces with which to meet an attack on London. He also read another letter addressed to Sir William Robertson, dated the 6th of July, in which, after pointing out that he now had at his disposal only twenty-one efficient fighters, he said: 'I 'desire to place on record my most emphatic opinion that 'even with the addition of twelve Sopwith Scouts, which 'it is hoped will be available by the 15th instant, the 'aeroplanes which I can dispose of are not sufficient for 'effective action against raids in force. Such raids may 'certainly be expected, and if London is again subjected 'to attack the results may be disastrous.'

These letters came as something of a shock to the members of the War Cabinet who commented 'severely 'and adversely' on the fact that the letter of the 2nd of July had not been brought to their attention. Had this been done the question of sending the fighting squadrons back to France would, undoubtedly, have been reconsidered. It was true that it had provisionally been decided that they should return about the 5th of July, at the desire

¹ *Soldiers and Statesmen*, Vol. II, p. 17.

of Sir Douglas Haig, but the War Cabinet felt that the full discussion on air matters which they had had with Sir Douglas Haig and Major-General Trenchard at the conference on the 20th of June had left the members fully apprised of the air position on the Western front. They had, therefore, the knowledge to judge the relative importance and urgency of the home and overseas requirements. Subsequent inquiries about Lord French's letter of the 2nd of July revealed that it had not been seen by the Secretary of State for War or by the Chief of the Imperial General Staff. Because the letter had raised a minor point for the attention of the director-general of military aeronautics it had been passed to him for action. Sir William Robertson explained that he himself had taken the responsibility of returning the two squadrons to Sir Douglas Haig in accordance with the provisional decision originally made. There the matter was allowed to rest.

The Government had, at this meeting, ordered the return of one fighting squadron to England, but that was an immediate measure which left the main problem unsolved. At a subsequent Cabinet meeting, on Wednesday the 11th of July, the matter was again debated. One difficulty which the Government had to face, in trying to reassure the public, was that they could not, for obvious reasons, advertise that they had weakened the air fighting strength on the Western front in order to provide defence aircraft for England. But apart altogether from the question of allaying the general disquiet, it was obvious to the Government that the problem of home defence against air attack could not be isolated, that it must take its place in a survey of the whole air policy and organization.

The Government decided, therefore, to set up a committee to examine:

- (i) the defence arrangements for home defence against air raids, and
- (ii) the air organization generally and the higher direction of aerial operations.

The committee was of a special kind. Its chairman was

the Prime Minister, Mr. Lloyd George, who was too busy to give much more than the prestige of his name, and the committee was really a one-man affair, and that one man was Lieutenant-General J. C. Smuts. He consulted the experts and presented his first report, dealing with the problem of Home Defence, on the 19th of July. His second report, on the subject of air organization, a notable document in the history of the Royal Air Force because it did much to ensure the creation of a separate air service, will be dealt with in the subsequent volume. The German daylight aeroplane raids, indeed, had a profound effect on the whole air organization and development in Great Britain, and Hauptmann Brandenburg's No. 3 Bombing Squadron may lay claim to an important share in the foundation of the Royal Air Force. A general comment of Sir William Robertson on the results of these daylight raids may be repeated here: 'When war is afoot', he says, 'the requirements of Home Defence, whether on land, on sea, or in the air, will, except perhaps in the case of a great crisis, such as that which occurred in March 1918, invariably have to be given precedence over requirements connected with operations abroad.'¹

The report of Lieutenant-General Smuts on the subject of Home Defence, given in full in Appendix VI, concerned itself, in effect, with the defence of the London area. 'London', said the report, 'occupies a peculiar position in the Empire of which it is the nerve centre, and we consider, in the circumstances, that its defence demands exceptional measures. It is probable that the air raids on London will increase to such an extent in the next twelve months that London might through aerial warfare become part of the battle front. . . .' It was pointed out that the defence organization had been built up to counter night attacks by Zeppelins. If a single aeroplane, with its incendiary or explosive ammunition, came within reach of an airship there was small chance that the latter would escape destruction. To the aeroplane gunners, also, the target was a big one, and could often be illuminated by searchlights and held for lengthy periods. There had,

¹ *Soldiers and Statesmen*, Vol. II, p. 18.

therefore, been no need to concentrate the defence forces, whether guns or aeroplanes. Day attacks by close formations of aeroplanes called for an entirely different technique of defence. They could only be properly met, said the report, 'by a barrage fire from guns concentrated in batteries at suitable points in front of the area to be defended, or by Flights or Squadrons whose object is, by concentrated attack, to break up the hostile formation and destroy individual machines after they have been scattered out of their formation. . . .' It was recommended, therefore, that a defensive anti-aircraft gun barrage, covering London, should be established, and that three single-seater fighter squadrons, with pilots trained to fight in formation, should be made ready for home defence as rapidly as possible.¹

On the matter of organization, it was recommended that a senior officer of air experience should be placed in executive command, under the Field-Marshal Commanding-in-Chief, of the defences of the London area.² The appointment was given, on the 5th of August 1917, to Brigadier-General E. B. Ashmore. His command embraced the whole area considered to be liable to aeroplane attack and was, therefore, much wider than the term 'London Air Defence Area' implies. It included:

- (i) the whole of the anti-aircraft fixed defences (guns and lights) in the anti-aircraft commands of London, Harwich, Thames and Medway, and Dover, with the Eastern Command detached defences.
- (ii) such anti-aircraft mobile batteries as were placed at his disposal. These included the mobile brigade

¹ No. 44 (Sopwith two-seater) began to form at Hainault Farm on the 24th of July; No 61 (Sopwith 'Pup') at Rochford on the 2nd of August; and No. 112 (Sopwith 'Pup') at Throwley on the 30th of July. No. 44 was re-equipped with Sopwith 'Camels' in August and September.

² Sir David Henderson, in a memorandum to Lieutenant-General Smuts on the 16th of July, had said: 'I would suggest that the whole of our defences against air attack, observation, communication, aeroplanes and guns, should be organized under a single command. As the aeroplane is by far the most important means of defence, the commander should be an officer of the Royal Flying Corps. It is desirable that he should still be under the general command of the C.-in-C., Home forces.'

and the anti-aircraft mobile batteries then in the Harwich and Dover anti-aircraft defence commands.

- (iii) such Royal Flying Corps home defence units as were placed at his disposal. When the command began these were the home defence squadrons, Nos. 51, 75, 37, 39, 50, and 78. Others were added later.
- (iv) the aircraft observation posts under the Commandant, Observer Corps, Royal Defence Corps, in the warning districts roughly east of the line, Grantham—Portsmouth.

When Brigadier-General Ashmore took up his command he found that schemes for a reorganization of the gun defences had already been put forward and were awaiting decision. On the 21st of June Lieutenant-Colonel Simon, the Anti-aircraft Defence Commander, London, had submitted a plan, which involved forty-five additional guns, with the object of strengthening some of the gun sections on what was then the perimeter of the London defences in order to greet the enemy with a shower of shell bursts. The scheme had been rejected on the ground that there was a shortage of guns and men. On the 16th of July Lieutenant-Colonel Simon had, on the suggestion of the Royal Flying Corps, submitted another scheme, the main feature of which was the construction of a ring of gun stations round London to meet the bombing formations with heavy bursts of gun-fire about twenty-five miles from the capital with the idea of breaking up the formations to enable the home defence pilots to engage the raiders in detachments or individually.

On the 23rd of July Lord French had put forward the scheme to the War Office. He had pointed out how difficult it was for the Royal Flying Corps pilots to deal with large formations of Gotha type aeroplanes well equipped for defence. 'Isolated attacks', he said, 'by aeroplanes on these unbroken formations are, it is clear, a useless sacrifice. . . . The task of our Royal Flying Corps units would be rendered much easier if the enemy formation could be broken up and use made of our superior power of manœuvre to deal with the enemy in

'detail. Simultaneous attack, by aeroplanes and anti-aircraft guns, is not possible, but combined tactics in which the guns are assigned the definite role of breaking up the enemy formation, while the aeroplanes, having gained their height, are waiting to attack the enemy as he emerges in detached groups from the zone covered by gun fire, are it is considered not only possible, but essential to success.' He asked therefore for enough guns of the 3-inch 20 cwt. type to provide a barrage arc covering London from attack from any direction from the north, by way of the east, to the south. The time would come when the enemy bombers would make their approach to London from the west, and as guns became available Lord French asked that the circle should be completed to ensure protection from every direction. He estimated that a total of 110 guns would be necessary for the first part of the scheme, and eighty more to make the circle complete. Lord French was told, in reply, that the matter of a reallocation of anti-aircraft guns for home defence would be laid before the War Cabinet, but that, meanwhile, he should consider taking guns from places less likely to be attacked. The War Cabinet, when the question came up for discussion, decided to adhere to their decision recorded in December 1916, that the deliveries of 3-inch 20 cwt. guns must go to arm merchant vessels. Lord French was so informed on the 9th of August, and, to build up the eastern gun barrier, ten guns were withdrawn from other stations around London, and twenty-four from the provinces.

Public Warnings for London

The German daylight attacks raised, once again, in an acute form, the question of giving public warnings in London.¹ So long as people were not warned in time to take cover it was obvious that they would be caught crowding the business thoroughfares, and that the casualties would continue to be heavy. On the other hand,

¹ Outside the London area, the question whether a warning should or should not be made public was mainly a matter to be decided by local authorities.

unless the warnings could be confined to those occasions when it seemed fairly certain that London would be attacked, the interruption of work would be greater by day than by night and might reach the point when it would become intolerable. After the raid on London on the 13th of June local authorities in the Metropolis had been consulted, and the Home Secretary had afterwards called a conference, on the 21st of June, which had been attended by the Lord Mayor of London and by the mayors of the London Boroughs. The general opinion expressed at the conference was that public warning was desirable, and it was suggested that the order *Take Air Raid Action* might be supplemented by a later warning, which could be made public, on the nearer approach of the enemy.

The question was considered by General Head-quarters, Home Forces, who argued that the speed of the enemy aeroplanes made it impracticable to issue a second warning in time to be of use. The matter was referred to the War Cabinet who decided, on the 26th of June, against the dissemination of a public warning, and this decision was announced in the House of Commons by the Home Secretary on the same day.

Then came the daylight attack on the 7th of July which was followed, once again, by insistent demands that the public should be warned when raids were anticipated. The War Cabinet reconsidered the question on the 10th of July and reversed their decision of the 26th of June. The object, it was now stated, should be to give a warning of five minutes at the circumference of a circle with a radius of ten miles from Charing Cross, that is to say a circle which would cover the main populated districts of London. Allowing four and a half minutes for transmission, the warning would have to be given when the enemy aircraft were crossing a line twenty-two miles from Charing Cross. There was, however, no line of observers at that distance, the existing line of the London defences being closer in, at an average of sixteen miles from the centre. The idea of establishing observation posts farther out was considered, but abandoned. Instead, the existing stations of the Medway defences were used together with some

of the new gun stations which were set up as a result of the reorganization of the defences. They formed an incomplete ring, at a distance of twenty to twenty-five miles, from the north-west, by the north and east, to the south of London.

Many suggestions about the form the warning should take were put forward, among them the ringing of telephone bells, the lighting of street lamps, the clanging of tramcar bells, the firing of blank charges from anti-aircraft guns, and the sounding of sirens. It was objected that all except the last-named would either take too long or else be ineffective. Few patterns of siren of sufficient power existed, and trials with these revealed that large numbers would be required to attract general attention above the roar of London traffic. This raised the difficulty that sufficient stations with the necessary power to work the sirens would be hard to find.

Attention was turned to the design of a rocket which would explode with a loud noise and give off a cloud of coloured smoke. Experiments with rockets were made, but before a suitable type was produced it was decided to make use of the 'Socket distress signals', used at sea, which were sound bombs, or 'maroons', fired from a small brass mortar. They were tested on the 19th of July and proved effective over an area of rather more than a square mile. The maroons had the advantage that they could be fired from any building and that they were manufactured as a regular Board of Trade and Admiralty store, and could therefore be obtained in large quantities at short notice.

The next problem was to decide which authorities should be made responsible for firing the maroons. It happened that there was in existence an observation service whose chief duty was to report outbreaks of fire and explosions caused by enemy attacks. This service had been organized when air defence was an Admiralty responsibility, and it had its head-quarters at County Hall, Spring Gardens. It was under the direction of Commander Henry Paget, R.N.V.R., and included about 1,200 civilian volunteers who manned posts in various parts of

the County of London. The posts were linked with a central observation room at the County Hall with which, also, the Fire Brigade head-quarters was directly connected. There were many instances when lives and damage were saved as a result of the prompt warnings of fire given by this observation service. It seemed that the organization could be easily adapted for the issue of public warnings, and it was proposed, therefore, that, within the County area, the maroons should be fired from the Fire Brigade stations. Outside that area, within the ten-mile circle, they could be fired from selected police stations, all of which were already on the warning lists. The orders to fire the maroons could be given, from County Hall, to Fire Brigade head-quarters and to Scotland Yard. The proposals were approved and Commander Paget went ahead with his arrangements.

Meanwhile, as a temporary measure, pending the organization of the new scheme, it was arranged that Scotland Yard should be responsible for distributing the warning. On receipt of information from General Headquarters, Home Forces, that an attack appeared imminent, Scotland Yard was to instruct all police stations to send out men on foot, on bicycles, and in motor-cars. They were to carry *Take Cover* placards to which they were to draw attention by blowing their whistles, or by sounding bells and horns. They were to go out, similarly, with *All Clear* notices when the danger was over. A statement to this effect appeared in the press on the 14th of July. The same evening the new arrangements were put into operation through a false alarm about enemy aircraft. The warning order was cancelled soon after it was issued, but it had been in operation long enough to show that it would be fairly effective in clearing the streets. The maroons also were first used as a result of a misunderstanding. It was not definitely decided that they were to be employed for public warning until the 21st of July, a Saturday, but early next morning, before the people could learn, through the press, of the new arrangement, they heard the noise of maroons and assumed that an attack was in progress. There was, in fact, an attack

on Harwich and Felixstowe, but the Gothas did not penetrate inland and the London maroons were fired through a misunderstood message. The affair, however, showed unmistakably that the warning was too noisy and lasted too long. The number of stations firing maroons was therefore cut down, and each was to fire two instead of three as originally planned.

The warning organization at County Hall took some time to establish, and by the time it was ready the general position had changed. In the first place, the Commissioner of Police, who was ultimately responsible for the effectiveness of the public warning, was reluctant to end an arrangement by which the executive order came from him. The interim organization which he had set up had worked well and his staff, as well as the police stations, had had opportunity to become familiar with its workings. Furthermore, the Government had decided that the maroon signals were to be fired only as a warning of attack by day, and that the police must remain responsible for the dissemination of warnings by night. Although daylight attacks might continue to be made, it seemed possible that night attacks might become more important.

The arguments put forward by the Commissioner, that he and not Commander Paget should be responsible for spreading public warnings, were not disputed, and the scheme which emerged was as follows:

By Day. General Head-quarters, Home Forces, communicated to Scotland Yard, the London Fire Brigade, and to the City Police, the code words READINESS, RED DAY, WHITE DAY, and ALL CLEAR.

It will be remembered¹ that the colour code words were used to indicate the successive

¹ See Vol. III, pp. 175-6. In that volume it is stated that the code derived from the coloured lights shown on a transparent map in the Operations Room at the Horse Guards. This is true, but it is of interest that the system of lights followed the printed forms used by the General Post Office to send out the various warnings. Each message was printed on a different coloured form. Supplies were issued to the telephone exchanges, and the subscribers required to be notified on receipt of each message were entered locally, in advance, on the appropriate form.

warning orders, that is, *Warning only* (Green); *Take Air Raid Action* (Red); *All Clear* (Yellow); and *Resume Normal Conditions* (White). The preliminary warning (green) was usually given when the hostile aircraft were about fifty or sixty miles from the district to which the warning was issued. The word *Readiness* was preferred by General Head-quarters, Home Forces, because it was desired to issue a warning on the first sign of enemy air activity. Under the new scheme, General Head-quarters, Home Forces, also kept Scotland Yard and the London Fire Brigade informed of the approach, and return, of the enemy aircraft between the coast and the line of guns of the London barrage. As soon as the bombers were observed by the guns of the barrage, it was the duty of the London Anti-Aircraft Defence Commander to give the information to Scotland Yard, and to keep it informed, subsequently, of the main movements of the enemy pilots until they left the area of the London defences.

By Night. The code words, GREEN, RED, YELLOW, and WHITE were given to Scotland Yard, the Fire Brigade, and to the City Police, by General Head-quarters, Home Forces, and subsequent information, as by day, about the enemy movements. Scotland Yard was informed by the London Anti-Aircraft Defence Commander when the enemy aeroplanes were observed by the barrage guns, but subsequent movements were not reported. Scotland Yard took action as soon as it became clear that the enemy aircraft were about to cross the outer defences. A message, *Commissioner's Warning—Take Cover*, was issued to all police stations in the Metropolitan area, to the City Police headquarters, and to Fire Brigade headquarters.

The message was also passed to the Trunk Exchange Manager and transmitted by him to all Metropolitan police stations outside the County of London. The object of duplicating these messages was to obviate the risk of delay or non-delivery of the message in the outer areas which might be the first to be attacked.

The message was regarded as an order to fire the maroons, or to send out the *Take Cover* notices. When it was clear that the enemy had gone, a further message, *Commissioner's Notice—All Clear*, was communicated in the same way as the Commissioner's *Take Cover* message. It was some time before a satisfactory method of disseminating the *All Clear* notice was reached. Experiments were made with a signal which could be fired in the same way as the *Take Cover* signal, but would have a different sound. Eventually, however, the Commissioner enlisted the services of Boy Scouts who blew bugles as they were driven round the streets in motor-cars. At the same time, constables on cycles rode around shouting *All Clear* as they went.

London was never again attacked by day after the 7th of July 1917, but in September there began a series of moonlight raids. Before the night raids, however, some minor daylight attacks took place on the eastern and south-eastern counties. Just after 8 a.m. on the 22nd of July twenty-two Gothas approached the Suffolk coast in Hollesley Bay, and then turned southwards and bombed Felixstowe and Harwich. Most of the bombs intended for Harwich fell in the harbour, but at Felixstowe an hotel and three houses were seriously damaged, an engineer's shed was demolished on the Royal Naval Air Service station, and there were a number of casualties. Thirteen men, including 11 soldiers and a naval airman, were killed and 24 men (20 soldiers, 3 naval ratings) and 2 women were injured. One hundred and twenty-one

British pilots went up to fight the raiders. The Gothas, however, were over the country for so brief a period and the information about their movements was so scanty that very few pilots saw anything of them. It should be remembered that the patrol areas were shaped chiefly to cover the approach to London, and had the Gothas made for the capital, or, indeed, come any distance inland on this occasion they would have been met by patrols of fighting aircraft. Many of the patrolling British aeroplanes were fired at by the anti-aircraft gunners who mistook them for German, and two were hit and damaged, but were landed safely.

One pilot, in a two-seater, found the Gotha formation and followed it towards Zeebrugge, where he vainly attacked the rearmost bomber. A Bristol Fighter patrol of No. 48 Squadron, which went up from the frontier aerodrome near Bray Dunes, met five of the returning Gothas and one pilot forced a Gotha down on the sea north of Ostend.¹

About 5 p.m. on the 12th of August ten Gothas, in formation, were seen approaching Felixstowe. They did not come in at once, but followed the coast in a south-westerly direction and, at 5.50 p.m., were over Rochford, where they dropped three bombs, two of which fell near the hangars on the aerodrome of No. 61 Squadron and wounded two mechanics. By this time a formation of sixteen Sopwith 'Pups' of the squadron was gaining height, and the presence of the British fighters seemed to flurry the bombers, who began to straggle as they turned off towards Leigh, Westcliff, and Southend, where bombs fell in succession, killing 32 civilians and injuring 43. The raiders went straight out to sea with the Sopwith 'Pups' of No. 61 Squadron in pursuit, but although the 'Pups' were faster the bombers had the advantage of height and could not be caught until they were about forty miles distant from the coast. The leading 'Pup' pilots engaged the enemy, but, owing to gun trouble or through petrol shortage, the combats were brief and indecisive. A number

¹ According to German information one Gotha crashed and was wrecked on landing on its home aerodrome, but no other loss was incurred.

of other pilots who pursued the Gothas to sea had individual encounters, one of which was successful. Flight Lieutenant H. S. Kerby, who had gone up from Walmer in a Sopwith 'Pup', attacked a Gotha which, apparently in difficulties, was flying about 4,000 feet below the main formation. The Sopwith pilot forced the Gotha down on the water, where it overturned. One member of the crew was seen to be clinging to the tail, and Flight Lieutenant Kerby dropped a lifebelt in the hope that the German would be enabled to keep afloat until help arrived. On the return journey the British pilot found four destroyers on passage to Dunkirk, and he fired Very lights to indicate that he wanted the destroyers to follow him to the wrecked Gotha, but his message was not understood and the destroyers continued on their course. It was afterwards announced by the Germans that the Gotha had been lost with its crew. The enemy formation had been seen on its way to England by a fighting patrol of naval aeroplanes from Dunkirk. The naval pilots pursued the bombers, but had to land in England owing to lack of petrol without having had any opportunity for decisive encounters. The raiders, on their way home, were again attacked by Dunkirk pilots near the Dutch coast without result. A subsidiary bombing attack, by one Gotha, was made on Margate. Four bombs were dropped soon after 5.40 p.m., but they inflicted little damage, although one woman was injured. The German records show that the Gotha which attacked Margate had engine trouble and was ultimately compelled to make a forced landing at Zeebrugge. They also reveal that four Gothas were wrecked on landing in Belgium.

Another attack was attempted on the 18th of August and, although no bombs fell on English soil, the attempt presents some features of interest. On this day England lay between a low pressure area centred over the north-west of Scotland and a high pressure area over Germany. Above Belgium and the Netherlands the sky was cloudless and the barometer was rising, but over England the sky was overcast and the barometer was falling. Twenty-eight Gothas set out in the morning sunshine and headed

for England which, unknown to the crews, was at that moment rain-swept. The bombers came down the coast until they were off Dunkirk and then turned towards the English coast. But the Channel and the air above it were turbulent, and it must have become clear to Hauptmann Kleine, who led the attackers, that to proceed was useless. He kept on a northerly course, possibly with the intention of making a wide circle over the North Sea to take him back to the Belgian coast near the Dutch frontier, but as he proceeded the strength of the wind increased and the Gothas began to straggle. One of them, running for home direct, came down on the beach near Zeebrugge. Most of the others passed over the Dutch island of Schouwen, where six bombs were dropped about 11.30 a.m. The leader succeeded, hereabouts, in turning the greater part of his squadron south-west again and they were last seen about twenty strong, flying in the direction of Zeebrugge. Two, however, which got lost over Holland, were shot down by Dutch gunners near the German frontier. The crews, uninjured, were made prisoners, and the Gothas were destroyed. It is possible that some of the main formation crashed when attempting to land because when Hauptmann Kleine set out to attack the Kent coast four days later he could muster only fifteen aeroplanes, four of which had to turn back on account of defects.

The Mystery of a Zeppelin Attack

Map 3 The next aeroplane attack was preceded by an airship raid. On the 21st of August eight naval Zeppelins set out from the north German sheds. They were the *L.35*, *L.41*, *L.42*, *L.44*, *L.45*, *L.46*, *L.47*, and *L.51*, under the general command of Fregattenkapitän Strasser who flew in the *L.46*. While the ships were in the air Strasser sent out a wireless message to the commanders informing them that the conditions were favourable for a raid on central England (*Mitte*) and they were instructed to attack accordingly.

So far as British observation went, the raid was of a simple kind. The airships, keeping well together, approached the Yorkshire coast until they came within

sixty miles of the Humber, when they dispersed and cruised about for three hours. Eventually one airship, the *L.41*, commanded by Hauptmann Manger, attempted an attack on Hull. She crossed the coast soon after midnight, but never reached the city, from which it appeared she was turned back by the searchlights and by heavy anti-aircraft gun-fire. Her bombs were dropped on Paull, Hedon, Preston, and Thorngumbald. The damage, confined to Hedon, was comparatively small: a Methodist Chapel was destroyed, and some cottages, a Roman Catholic building, and a Y.M.C.A. hut were damaged. In addition, one man was injured. Two of the twenty pilots who went up to attack the *L.41* saw her, but they could not get near enough to engage her. One of them while flying at 15,000 feet estimated that the *L.41* was some 5,000 feet higher still and, although he pursued her twenty miles out to sea and fired bursts at long range, he could not get near enough for effective attack.

So far as we could judge none of the other airships came overland, and certainly no other bombs were recorded on any part of the country. When, therefore, the German Admiralty issued a somewhat lengthy report of the raid, in which it was claimed that the Zeppelin fleet had bombed Hull, warships in the Humber, and various industrial establishments, it was assumed that the German *communiqué* was issued for home propaganda. The author of this history, however, has seen the full records of the airships concerned in the attack and can testify that the *communiqué* of the German Admiralty was made in good faith. Strasser's covering report shows that bombs to a total weight of 11,000-kg. were dropped. The airships encountered head winds and had also to reckon with the shortness of the night, so that it was impossible to penetrate any great distance inland. The *L.35* had to turn back when she was off Scarborough because she had small chance of attacking before light, and the *L.51*, which had compass trouble, also did not attack. Of the others, the German records show that Martin Dietrich in the *L.42* attacked ships off the Spurn and Spurn Point (he could not reach Hull because of an engine failure); Stabbert in the *L.44*

bombed groups of lights at Lincoln; Kölle in the *L.45* attacked warships off Withernsea; Hollender in the *L.46* came well in and saw in the distance the lights of a big city which he judged to be Sheffield, but as he could not get so far he turned back and dropped his main load of bombs on Louth; finally, von Freudenreich in the *L.47* attacked Grimsby.

As has been said, our own decision at the time, after consideration of all the reports of the night, was that none of these airships came overland. There is not much doubt that we were wrong. Among the British official documents dealing with this attack is a packet of reports to which it was judged no credence could be attached. In this packet, labelled *Hot Air*, are messages which show that an airship passed over Pontefract and was later reported near Rochdale in Lancashire, while from Doncaster came news of bombs heard exploding in the distance. The Zeppelins flew at great heights, up to 20,000 feet, and this fact, which made it difficult or even impossible for their commanders to know where their bombs were dropped, made it difficult also for the ground observers to follow the movements of the airships with certainty. It is not impossible that the *L.46* and one or two other ships came overland, but if they did what happened to their bombs? Could they all have found a resting-place on moorland wastes remote from habitation?

Nor is there any information about attacks on British ships. Patrol vessels off the Humber engaged a Zeppelin and fired a total of fifty rounds of ammunition, but there is no official record of bombs being aimed at these vessels or at any others off the East Coast during the night of August 21st/22nd.

The raid was ineffective, but it had one very disturbing feature, and that was the height from which the attack near Hull was made. At 20,000 feet the Zeppelins had nothing to fear from the night-flying aeroplanes with which the defence squadrons were equipped, none of which could get near this 'ceiling'. Nor did the airships' commanders need to concern themselves overmuch with the searchlight or gun defences.

The Last Daylight Aeroplane Attack

Before the last of the Zeppelins had landed in North Germany, fifteen Gothas were on their way to England. Four of them turned back with engine trouble, but the others came in over Margate about 10.40 a.m. and, after dropping five bombs, continued in a south-westerly direction. They did not, however, hold this course long because naval aeroplanes from Manston were already approaching their height. The Gotha pilots therefore turned south-east and attacked Ramsgate with thirty-four bombs. Seven of these fell on hospitals and some of the others on shop and house property. They killed eight men (2 soldiers) and one child, and injured twelve men (9 soldiers), two women, and seven children. There is little doubt that the bombs were dropped without much discrimination, because the raiders had been given such a reception from the moment they came overland that they had as much as they could do to think of their own protection. The anti-aircraft gun-fire with which they were met when they crossed was accurate and shells burst among the Gothas from the outset. Then the aeroplanes came up and pursued the bombers as they turned for Ramsgate. Two of the raiders were quickly brought down by gun-fire, one of them falling in the sea, and the other, in flames, between Westgate and Ramsgate. From the Gotha which fell in the sea, a member of the crew was rescued and it was learned from him that the intention of the raiders was to separate after striking the coast near the North Foreland. One detachment was to continue up the Thames Estuary to bomb Sheerness, and the other southwards to attack Dover.¹ The accuracy of the gun-fire and the presence of British aeroplanes brought about a change of plan, and the bombers, after the attack on Ramsgate, went out to sea again, pursued by naval aircraft, and recrossed the coast at Deal. Under vigorous gun-fire they went on to Dover, where they arrived about 11.10 a.m., and six of

¹ It is now known that the official objectives were (i) Southend (alternative Sheerness), (ii) Chatham, (iii) Dover.

them dropped a total of nine bombs which seriously damaged seven private houses, an inn, and a school. The casualties were two soldiers and one woman killed, and five soldiers injured. Some of the gunners who fired on the Gothas saw one of them fall in the sea and claimed it as a victim of their fire, but it was more probably shot down in combat by Flight Sub-Lieutenant J. Drake. The Gothas were continuously attacked over Dover, and across the sea to the Belgian Coast, by naval and Royal Flying Corps pilots, but no others were seen to fall. Naval pilots from Dunkirk had many fights both with the Gothas and with enemy single-seaters apparently sent up to escort the bombers home. Although the Dunkirk pilots did not succeed in sending down any of the bombers, they claimed to have destroyed five of the fighters. Exclusive of the Dunkirk aeroplanes, a total of seventeen Royal Naval Air Service and one hundred and twenty Royal Flying Corps pilots went up in search of the raiders, a commentary, once again, on the energy dissipated by the defence. It is fair to add, however, that had the bombers persisted to Sheerness instead of turning back they would have been caught by overwhelming numbers and would not have escaped so lightly.

The Germans realized that inland daylight raiding had now been made so difficult that it was not worth while to continue. After this attack on the 22nd of August, therefore, the daylight campaign was abandoned. 'Although, 'after the August raids', says Major von Bülow, 'the 'daylight raid tactics had to give way to the moonlight 'raids, this was due to no abatement of the fighting spirit 'of the squadron, but must be ascribed to technical reasons 'and to the improvement in the British anti-aircraft 'defences.'¹

The drawbacks associated with a purely defensive policy in the air are well brought out by the results which followed the daylight bombing of England. No. 3 *Kampfgeschwader*, which could not muster thirty aeroplanes for any one attack, twice induced the British Government to

¹ In *Die Luftwacht*.

withdraw fighting squadrons from the Western front, was responsible for the formation of three first-class fighting squadrons for service in England, compelled an increase in, and a drastic reorganization of, the anti-aircraft gun defences, and, during active operations, called into action anything up to ten times its own strength in aeroplanes. And it should be remembered that the fighting squadrons withdrawn at a critical time from a vital part of the Western front were given no opportunity to meet the enemy, that the formation of the new fighting squadrons in England, together with the re-equipment of certain other existing squadrons, diverted skilled pilots and first-class aeroplanes from service in France, and that few of the great number of British pilots who went up on patrol even so much as saw the raiders. It is a fact, also, that the Germans compelled us to reshape the defence system to meet the daylight raids and then, by changing over to night attack, stultified much of our plan. Above all, the daylight bombing of English cities was mainly responsible for the British Government decision, of July 1917, to double the air services.

While, however, it is important that the various results of the bombing campaign should be clearly stated, it would be wrong to infer that all, or any, of them were, or indeed could have been, foreseen by the Germans, who will probably read of them with surprise. The results did not flow naturally from preconceived plans because the knowledge and circumstances of the time did not make such plans possible. The Germans did not, for instance, work out what would be the effect on the defence system in England of a change from day to night raids and then proceed to shape their campaign accordingly. They changed to night attacks because they were forced to do so, partly because of improvements in the defences in the London area, and partly because of what Major von Bülow has called 'technical reasons'. These may be assumed to have connexion with wastage, during the daylight campaign, of aeroplanes and personnel, and their replacement by inferior equipment and less-experienced crews.

The Moonlight Campaign

A night raid during the period of full moon had been made on London on the 6th/7th of May 1917, but this had been an isolated occurrence without particular significance. The aeroplane attacks by moonlight which began on the 2nd of September were something quite different. It was the same Gotha squadron, No. 3, which was responsible for the night attacks, but it was later reinforced by a Flight equipped with the so-called 'Giant' aeroplanes (*Riesenflugzeug 501*). Many types of Giant aeroplanes were built by Germany during the war. The largest of them, constructed by the Siemens-Schuckert firm, had six engines of 300 horse-power each, but all the others had from three to five engines, of the Mercédès, Benz, or Maybach type, ranging from 110 to 265 horse-power: their speeds in still air were from 70 to 85 miles per hour. The Giants which were responsible for raiding England usually carried a crew of five (two pilots, one officer observer, and two machine gunners), and bombs totalling about 1,000-kg. in weight.¹

The moonlight campaign was opened with an attack on Dover. At 11.5 p.m. on Sunday the 2nd of September two aeroplanes, flying low, appeared over the town without warning, dropped their bombs, and disappeared before any searchlights or guns could get into action. Fourteen bombs, two of them converted 9.84-inch trench-mortar shells, weighing 91 kg., were traced, and they killed one officer, and injured one officer, three men, four women, and two children. The damage, to houses, a stable, and a timber-yard, was estimated at £3,486. About half an hour before Dover was attacked a raid had been made on Calais, and the bombing of Dover was probably subsidiary to the Calais attack.

Next night, the 3rd of September, with the weather conditions still exceptionally fine, the bombers came again, this time with more serious intent. At 10.35 p.m. two

¹ Technical data about the various Gotha and Giant types of aeroplane are set out in Table III, pp. 110-13, in *Die Deutschen Luftstreitkräfte im Weltkrieg* (Neumann).

aeroplanes crossed the coast at Westgate and dropped two bombs at East Northdown Farm, Margate, and five on St. Peters, but the only damage caused was to window-glass. One of the raiders then went out to sea, but the other apparently continued up the Thames Estuary and there joined one or more Gothas which were heard passing over Eastchurch at 11 p.m. Ten minutes later bombs began to fall in Chatham, and two of the twenty-six which we traced hit the drill hall at the naval barracks in which several hundred men were sleeping. A terrible scene followed, and when the victims of the raiders came to be counted it was found that one hundred and thirty naval ratings were dead and eighty-eight wounded. The remaining bombs which fell on the town destroyed a house and damaged property and, in addition, killed a naval rating and a woman, and caused injury to three men (including one naval rating and one soldier), three women, and two children. None of the enemy aeroplanes was visible from Chatham at any time and no anti-aircraft guns came into action: seven rounds were fired at one of the bombers on its way out at Herne Bay. So far as could be made out at the time, other Gothas had, meanwhile, come into the Thames Estuary and had passed to Sheerness, which was attacked with twelve bombs about 11 p.m. Some of these narrowly missed important targets, but none of them inflicted damage or casualties. The anti-aircraft guns in Sheppey fired on the enemy aeroplanes, which were momentarily seen from time to time without the aid of searchlights. One bomber was caught, fleetingly, in the beam of the Whitstable light, but had passed into darkness again when seven rounds had been fired. Sixteen aeroplanes of the Royal Flying Corps went up, but none of their pilots saw anything of the raiders. It is a point of interest that the combination of bright moonlight and dark clear sky made the task of the searchlight personnel difficult and the beams of the lights had little power. From a consideration of all the reports at the time it appeared that the total number of raiders was ten, but it is now known that only five set out and that one of these turned back with engine trouble. Actually,

very exaggerated numbers were reported from many places; all British aircraft were noted as 'hostile' and their number was overrated.

Although the British pilots had had no opportunity to attack the enemy, the happenings of the night had profoundly changed the outlook for the defence. Three pilots who took the air were making a pioneer effort. Major G. W. Murlis-Green, commanding No. 44 Squadron, equipped with Sopwith 'Camels', chafed at the thought that he must keep his pilots on the ground while the night attacks were in progress. No. 44 Squadron had been formed to fight the daylight raids, and contemporary opinion considered that the unstable Sopwith 'Camel', quick to respond to the controls, was entirely unsuited for night work. Major Murlis-Green, however, sought, and was given, permission to try the 'Camels' at night. During the attack on the 3rd of September, therefore, three pilots of No. 44 Squadron (Major Murlis-Green, Captain C. J. Q. Brand, and Lieutenant C. C. Banks) took off. They got into the air safely, patrolled for forty minutes, and then made good landings. The news spread at once and other day-fighting pilots began to practise night flying. By a coincidence, while the pilots of No. 44 Squadron were in the air demonstrating that unstable single-seater fighters could be flown at night, two pilots in France, also in 'Camels', were making the same discovery.

Map 13 In a raid on the following night, the 4th/5th of September, London was reached, and a new feature was the spreading of the attack over a period of time. The moon, two days after the full, was bright and the wind blew moderately from the south-east. Once again very exaggerated reports about the numbers and ubiquity of the bombers were received, showing how great was the tendency, at night and with nerves tense, to over-estimate. When, after the raid, the reports were carefully sifted and co-ordinated, it seemed that the bombers totalled twenty-six aeroplanes and that they had crossed the coast, in seven groups, between 10.20 p.m. and 12.10 a.m. According, however, to particulars published by Major Freiherr von Bülow,

who quotes German official records, only eleven aeroplanes, all Gothas, set out, and two of these had to turn back with engine trouble. The same writer mentions London as the objective, but bombs also fell on Dover and Margate, on Tiptree and Inworth in Essex, and on Orford and Aldeburgh in Suffolk. The attacks on London began at 11 p.m. on the 4th of September and were fairly continuous up to 11.58 p.m. There was a pause until 12.30 a.m. when another attack was made, followed by a second interval of quiet until 12.50 a.m., when a final group of bombs fell on the capital. The total number of bombs traced in London was fifty-seven, five of which did not explode, and the casualties were 8 men (including 3 soldiers), 7 women, and 1 child killed, and 25 men (8 soldiers, and one sailor U.S.N.), 1 constable, 23 women, and 7 children injured. In addition, 2 men and 1 woman were killed at Dover and 6 men (3 soldiers), 6 women, and 3 children injured at Dover and Margate. One of the first bombs on London fell in an unoccupied factory at Stratford which had, up to a short time before, been used as an internment camp for German civilians. Most damage to London was caused by one Gotha which came in alone over Hampstead about 11.50 p.m. The first bombs from this aeroplane wrecked a building in Castle Street belonging to a firm of Oxford Street drapers and damaged a cigarette factory nearby. The next group, four 50-kg. bombs, seem to have been aimed at Charing Cross Station. One bomb fell near Charing Cross Hospital and shattered most of its windows and did minor damage to twenty-four shops. The casualties, hereabouts, were 3 killed and 5 injured. The second bomb destroyed the back of the Little Theatre, without inflicting casualties, the third exploded harmlessly in the gardens near the Hotel Cecil, but the fourth wrecked a tramcar on the Embankment near Cleopatra's Needle and killed 2 men and a woman, and caused injury to 8 men (3 of them soldiers) and to one woman. The base of the Obelisk, the southern bronze sphinx, and parts of the Embankment nearby, were chipped and scarred. The marks are there to-day, one of the few remaining visible reminders of the

bombing of London. The final attack on London which began about 12.30 a.m. also caused serious casualties, mainly in Gospel Oak, Primrose Hill, and Paddington; the Islington Workhouse in Upper Holloway was partly wrecked.

The bombers were met, during their passage across England, by anti-aircraft gun-fire. A Gotha was occasionally found by the beams of a searchlight, but for the most part the gunners could see the bombers without the aid of the lights. Although none of the gunners had more than a fleeting opportunity to fire, it is clear, from the movements of the raiders as observed by us, that they were sometimes made to change their course and, in one instance, were forced to turn back when approaching from the east along the Thames. About eight hundred anti-aircraft shells were fired, but only one hit was reported. The commander of the gun at Borstal was convinced that a shell from the gun hit a Gotha which was flying on the Kent side of the river and that the aeroplane was destroyed. No wreckage was found, although the River Medway was dragged from Rochester Bridge to Halling, but the German records show that one Gotha was, in fact, lost during the raid under unknown circumstances. Eighteen pilots of the Royal Flying Corps went up, but only two of them caught a glimpse of an enemy aeroplane at different times. In each instance a few rounds were fired, but the quarry was quickly lost. Three 'Camel' pilots patrolled over London between 11.27 p.m. and 1.12 a.m., but did not see any of the Gothas which attacked the capital.

The opening of the German night campaign caused grave concern. At a meeting of the War Cabinet on the 5th of September Lieutenant-General J. C. Smuts was requested 'to hold an investigation into the last two 'nights' raids and favour the War Cabinet with his views 'as to the provision of protection for the civil population 'in the future, and his proposals as to carrying the air war 'into Germany at the earliest possible moment'. Lieutenant-General Smuts lost no time. He consulted the various experts and, on the 6th, submitted a paper to the War Cabinet in which he set down the main aspects

of the problem.¹ He laid stress on the point that the only proper defence against the night attacks was an offensive aimed at the enemy's air bases. 'Our aeroplanes', he said, 'afford no means of defence at night as they find it impossible to see the enemy machines even at a distance of a couple of hundred yards. In the recent night raids they have been sent into the air, but to no purpose, and they might just as well have remained on the ground.' Two measures of defence, he continued, would be tried in the London area. The first would be the installation of more powerful searchlights with a view to blinding the enemy pilots, temporarily, and so making it difficult or impossible for them to navigate. The second measure would be the establishment of a wire screen suspended from balloons 'and intended to form a sort of barrage in which the enemy machine navigated at night will be caught'.

The memorandum, like the others prepared by Lieutenant-General Smuts on the subject of air warfare, is of some historic interest. Although, however, it was true at the time the paper was written that the defending aeroplanes had been of little account at night, the promise of the pioneer flight made by the 'Camel' pilots on the night of the 3rd of September had not perhaps been adequately appreciated. The difficulty now was not very different from that which we had had to overcome before the Zeppelin had been defeated. It was not until the importance of the part played by searchlights in the scheme of aeroplane defence was realized that pilots could look forward to attacking airships with some assurance of success.² Although bombing aeroplanes did not form a target comparable with Zeppelins, and searchlights lost some of their power on moonlight nights, the point was that if the bombers could be illuminated the fighting pilots could be expected to prove that the fighting aeroplane would be no less effective by night than it was by day. The defending aeroplanes might still do their part even without illumination provided the searchlights' beams were reasonably accurately concentrated on the sound made by the enemy aircraft. If they did not search, but

¹ Appendix VII.

² See Vol. III, p. 148. Also pp. 165-70.

steadily followed the sound, the defending pilots, guided to the meeting-point of the searchlight beams, would have a good opportunity to pick up the enemy aeroplane by the flame from its exhaust.

Major-General E. B. Ashmore, in his book *Air Defence* (p. 54) has something to say about this aspect of the question. 'As a result of these raids', he writes, 'it appeared to me that, although we should have to rely mainly on the gun barrage for a time, it would only be for a time and that, after some training and practice, a large number of pilots would follow the pioneers of the 3rd September and fly scouts at night. If the scouts could find the bomber it should be possible to repeat the 1916 success of the aeroplane in night defence.' He goes on to describe how he cleared the aeroplane patrol zone of guns and put additional searchlights in their place so that pilots would be able to fly without risk from gun-fire and with an added chance of finding their targets illuminated for them. The outer gun barrage was, at the time, in the form of a crescent on the east side of London with the points near Hatfield in the north and near Redhill in the south. 'The guns taken out of the patrol zone, with the addition of six batteries of mobile guns from the east and north-east of England, were therefore used to extend the barrier which was eventually to form a complete circle round London, about ten miles out from the thickly populous area. None of our aeroplanes were to fly at night in the area just outside the gun barrier; the guns could be certain that any aeroplane heard there was hostile. On the morning after the London raid I produced my idea for a balloon apron barrage to be put up just outside London and inside the aeroplane patrol lines. The idea was at once approved by Lord French, and also by General Smuts, who was then the special adviser of the War Cabinet on air defence matters.'¹

Balloon Aprons

The idea of netting areas of the sky had been put forward from time to time before and during the war. On

¹ *Air Defence*, pp. 54-5.

the Allied side something of the sort had been tried at Venice, and a Royal Flying Corps officer had been sent to Italy, at the end of June 1917, to report on the scheme. It appeared that there were seven balloon stations at Venice, each provided with ten balloons. At the beginning of each moonlight period the balloons were inflated, and they so remained while the possibility of raids existed. When required for use, the balloons were hooked to cables on winches attached to rafts which were towed at dusk to allotted points. The balloons were let up to about 10,000 feet, at distances of just over 200 feet, around Venice. Any enemy aircraft which descended to the height of the balloons, or lower, ran the risk of fouling the balloons or the cables by which they were connected with the rafts.¹

Major-General Ashmore put forward his scheme for a London balloon barrage on the 5th of September. Making reference, in his memorandum, to the raids of the two previous nights, he said: 'It is also shown that guns, defending machines, and such lights as we have at present, are quite ineffective as a reply. This being the case it will, I think, be necessary to divert production from other objects to meet the new danger.' He went on to suggest the balloon barrage and he proposed that between the balloons a cross cable should carry weighted wire streamers to form a so-called apron. He asked that as many observation balloons of the Caquot type as could be spared should be sent home from France, and that orders should be given for one hundred small balloons of

¹ A form of balloon and kite barrage was tried experimentally by the Germans in the winter of 1914/15, but nothing much was done with this form of defence until March 1917, when balloon-barrage detachments were formed to protect important industrial establishments. Balloons (or kites when the wind was strong) were let up to about 8,000 feet. The cables had thin wires attached (called side-branches) carried by open wind sleeves. The barrages were expensive to maintain, but they were continued until the end of the war because their moral effect was considered to be great. The effect was twofold, on the crew of the bombing aircraft and on the people who were protected. See articles on Home Defence in Germany in *Die Luftwacht*, May-October 1918, by Major Grosskreutz (Army) and by Captain Meine (Navy).

the type used in the defence of Venice. He proposed to use the latter, each on a single light cable, over the waterways of the Medway and of the Thames.

The scheme was approved by the Government, and, after some experiment, Major-General Ashmore was able to state, on the 19th of September, that he was arranging to instal two balloon aprons on the easterly borders of London. Each apron would consist of five Caquot balloons disposed in a straight line 2,000 yards in length, with the balloons linked together by cable and anchored to the ground at three points: wire streamers, 1,000 feet long, were to be suspended from the horizontal connecting cables.¹ On the 22nd of September, in orders issued to home defence pilots, it was stated: 'Balloon Aprons and other obstructions will be established on the line: east side of Lewisham—east side of Plumstead—one mile east of Barking—east edge of Ilford, east edge of Wanstead—north edge of Tottenham. No machines are to fly across this line during operations at a height less than 10,000 feet.' The order went on to say that in the London area anti-aircraft guns would fire, by sight and by sound, on all enemy aircraft within the Apron Line.

At a War Cabinet meeting on the 1st of October Major-General Ashmore stated that the maximum height of the balloons was, at that time, 7,000 feet. Five days later he reported that the first of the aprons was in successful operation, and that he proposed to proceed with the full scheme for the installation of a cordon of twenty such obstacles. The aprons, he said, would each be let up nightly to heights varying between 7,000 and 10,000 feet and thus present a line of streamers 1,000 feet deep over a distance of 20,000 yards. He also put forward an establishment for a Home Wing of five balloon squadrons which would require a total personnel of 3,587. The Commander-in-Chief, Home Forces, agreed to these proposals, and, on the 23rd of October, informed the London District that approval had been given for 'the installation of a cordon of 20 Balloon aprons, approximately on the

¹ As finally decided, however, three balloons instead of five were employed for each apron.

'line, Tottenham, Ilford, Barking, Woolwich and Lewis-ham, subject to such modifications as experience may suggest.' According to a report of Lord French, made on the 17th of January 1918, three aprons were then in operation, each consisting of 'three Caquot captive balloons 500 yards apart connected by a horizontal wire from which are suspended steel wires 1,000 feet in length at 25 yards intervals.'

In a memorandum dated the 15th of April 1918 Major-General Ashmore stated that seven aprons were in action, and that the eighth was nearly ready. 'We have at last succeeded', he went on, 'in finding a good form of streamline balloon, larger than the ordinary Caquot. . . . We have tried experiments with small balloons, to go up in important places where an apron would not be possible. A suitable type and wire have been found and small balloons are being installed.' On the 27th of May, in another report, it was stated that nine of the authorized twenty aprons were in action, all east of London, eight being north of the Thames and one to the south. 'These aprons', said Major-General Ashmore, 'are at present capable of attaining a height of 9,500 feet. Balloons of a new design are now in manufacture. With these it will be possible to raise an apron of an increased depth to some 12,000 feet. In my opinion, the balloon aprons are an essential part of defence; to do away with them would have the worst possible effect. Our aeroplane patrols would have to cover all heights instead of a comparatively narrow zone as at present. London would certainly be bombed from low heights at which considerable accuracy is attainable.'

After the German night aeroplane attack on London on the 19th/20th of May 1918, during which eight Gothas were destroyed or forced down by defence pilots or by gun-fire,¹ there was a confident feeling in England that the German aeroplane menace had at length been overcome. On the 14th of June the Air Council informed the War Office that the tenth balloon apron would complete the programme for the defence of London, 'a decision

¹ See pp. 127-30.

'having been made that no further aprons will be formed.' In other words, the balloon apron scheme was cut down by half. The position, when the war ended, was that eight aprons were in position from Edmonton to the Thames, and two from the Thames to East Wickham. The balloons were of three types: (i) Caquots of 33,000 cu. ft. capacity, capable of lifting the apron to 8,500 feet, (ii) Caquots of 40,000 cu. ft. capacity for a height of 9,600 feet, and (iii) Italian balloons of 37,000 cu. ft. capacity which could reach a height of 11,000 feet. It is of interest that the intention, before it was decided to curtail the apron scheme, was to produce balloons for an apron height of 15,000 feet, and that heights of 20,000 feet were talked about.

Height-finding Instruments

Although the detailed developments of anti-aircraft gunnery during the war do not come within the scope of this history, it will be necessary to make a few general observations on the subject. Aircraft introduced new problems into gunnery. Naval or land targets are determined in two dimensions, but the positions of air targets must be determined in three. This, however, would be comparatively unimportant if it were not for the rapid and variable movement of the target in the air. The older methods of naval and military gunnery assumed that the position and speed of a target did not appreciably change during the minute or so required to calculate, from the observations made, how the gun should be trained. The first shots were then considered to be trial ones, the observation of which would enable further immediate corrections to be made. Methods of this kind, applied to aircraft, would be useless for the reason that the target could not be expected to remain within range long enough to permit of detailed calculations. Furthermore, the anti-aircraft guns must be ready to fire at targets made invisible by clouds or by the shades of night.

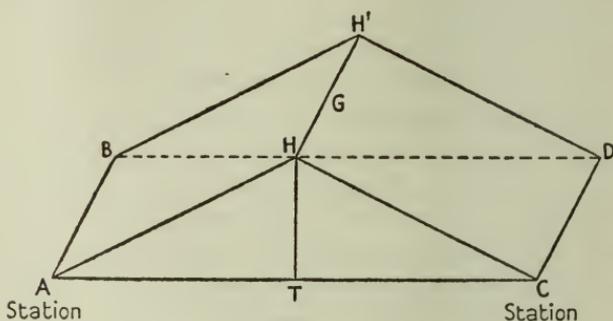
The problem then was to design instruments to make it possible to determine, with great rapidity, the position of the target, visible or invisible. Until early in 1916 anti-aircraft gunnery was based on range, and various

types of range-finder, beginning with the horizontal Barr and Stroud, were used. It was, however, difficult to pick up targets in the wide expanse of sky, and even if a correct range was obtained, by the time corrections had been made and transferred to the gun sights the aircraft had travelled so far that the information had already become valueless. It was soon realized that what the gunner chiefly required to know was the height of his target above the ground. This may be understood if one remembers that in order to determine how the gun should be pointed, the gunner must know not only the range, but also the angle of sight, that is, the angle, measured in a vertical plane, between the line of sight and the horizontal. From these two quantities the height of the target above the ground is easily calculable. Conversely, if the height and angle of sight are known, the range can be calculated. Now the range, because the aircraft is moving rapidly, is subject to constant change, whereas the height may be expected to remain more or less the same for minutes together. On this assumption, to any one gunner a knowledge of the height of his target, ascertained a few seconds before he is ready to fire, will be as valuable as if he knew the height at the moment of firing. Furthermore, the height, once known, will serve as useful information for all anti-aircraft guns in the neighbourhood. That is to say, a single determination of the height by one instrument will serve all local guns alike, whereas every gun would require its own range-finder.

This consideration led to the replacement for anti-aircraft gunnery of the range-finders, used in other forms of gunnery, by height-finders. Two principles were employed in these instruments. The first, represented by the Barr and Stroud Height-Finder, was essentially the calculation of height from the range and angle of sight. The Barr and Stroud range-finder with a base of two metres was combined with a scale for measuring the angle of sight, and a mechanical arrangement of gear-wheels and cams calculated the height from these quantities. The instrument was ingenious and, although the base was short, heights of many thousands of feet could be measured

with all the accuracy that was required. The Barr and Stroud Height-Finder was, however, expensive and somewhat elaborate and did not come into general use in the war.

The second principle was suggested to the Munitions Inventions Department in January 1916, independently, by Mr. G. T. Bennett of the National Physical Laboratory and by Lieutenant J. M. Mansell-Pleydell, and it also appears to have been discovered in France about the same time. It is generally known as the 'Bennett' or 'Roof' principle, which can best be illustrated with reference to a figure.



Let us assume that $ABH'H$ and $CDH'H$ are two sighting planes in use at the observing stations A and C which are a known distance apart. The planes are hinged horizontally along the parallel lines AB and CD . They are rotated until the target, G , is sighted in both planes simultaneously, when a reading of the angles HAC and HCA will suffice to determine the height HT . AB and CD being horizontal and parallel, HH' is also horizontal. Therefore the height, HT , is constant for an object anywhere along the line HH' .

In its practical application, sighting tubes were pivotally mounted on trunnions at two stations about a mile apart. These trunnions, corresponding with the lines AB and CD in the figure, were parallel the one with the other. They were so mounted on fixed supports that the angles HAC and HCA could be immediately read on a scale. At each station were two men, one called the observer

and the other the telephonist. As soon as an observer sighted the target he reported to his telephonist who communicated the information to the plotting-station. When the telephonist at the plotting-station received news from the second observer that he also was on the target, he ordered 'stop' to both stations and each observer at once reported the angle indicated on his instrument. These angles were then transferred to a plotting diagram, already prepared, and on this the height of the target could be immediately read, and the reading was then communicated, by telephone, to the anti-aircraft gunners. The whole process from the time of the sighting of the target to the recording of its height, took about five seconds. This particular type of finder, known as the Bennett Height-Finder Telephonic Solution, was taken up early in 1916 by the Munitions Inventions Department, which also developed other instruments different in kind, but embodying the same principle. An electrical device was also adopted which combined into a single automatic operation the communication of the angles at the two ends of the base and the calculation of the height. The observers had only to keep the target in the planes of their instrument and the height could be read off a volt-meter placed in any convenient position near the guns. The cost of the original Bennett Height-Finder was about £20, but the electrical type, which required a somewhat complicated installation, cost about £500. By the time of the Armistice, the majority of the height-finders in use for home defence were of the electrical kind.

*Sound-Locators*¹

The development of sound-locators for finding the direction of aircraft, audible but invisible from the ground, began in 1917. The idea was that if the approximate position of night-flying aircraft could be indicated to the searchlight personnel, it would not be long before the target would be illuminated so that the height-finders and

¹ The development of sound-locating instruments is summarized in an article, 'Binaural Sound-Locators', by E. T. Paris, D.Sc., F.Inst.P., in *Science Progress* for January 1933.

gun-sights could determine its exact position. Sound waves travel in the air at about 1,100 feet per second, that is to say, about ten times the speed of the war-time Gotha bombing aeroplane. What may be called the 'line of sound' is the direction of the aircraft at the moment when the engine noise which reaches the listener's ears left the aircraft. But while the sound waves have been travelling earthwards the aircraft has moved appreciably, say a quarter of a mile or more. Furthermore, the air is not the clear medium for sound which it is, on a fine day, for light. The air is apt to play tricks with sound waves which are refracted by the temperature lapse-rate in the atmosphere, and by the variation of wind strength and direction with height above the earth's surface. If the speed and direction of an aeroplane were known, it would be possible to calculate its actual position at any moment from that indicated by the sound-locator, or as is popularly known, to 'correct for the lag of sound'. The data for this calculation, however, were often unknown under war conditions. The direction of an enemy aeroplane at night, for example, could only be guessed and this, with the other variables, made sound-location a very approximate affair. Nevertheless, the instruments evolved during the war were of great value, especially when employed in close co-operation with searchlights and as a help to the anti-aircraft gunners subsequent to the adoption of barrage fire. It has sometimes been said that had it not been for the sound-locators the German night aeroplane campaign would never have been defeated. This is going too far, chiefly because it is based on a belief that the barrage fire was far more effective than it was. When all allowances have been made, however, it can still be said that sound-locating instruments played a notable part in the effective development of air defence.

To understand the principle of the locators, we may begin by asking how, with the unaided ears, a definite impression of the direction of a sound is obtained. There is a delicate sense by which the reception in the two ears is differentiated. A sound coming from the right will reach the right ear a fraction of time before it reaches the

left, and vice versa, while one coming from direct ahead, or behind, will reach both ears at the same moment. A person will usually turn instinctively towards a sound until the reception in both his ears is identical and he will then know that the noise comes directly from in front or from behind. It is possible to distinguish between these alternatives to some extent, but the distinction is not so readily made as may be supposed. As the difference in sound reception in the two ears is one of time, it is obvious that if they were farther apart it would be still easier to determine direction. If two trumpets placed, say, five feet apart, were connected to the ears by tubing, the effective distance between the ears would be increased about ten times.

Such was the principle of a binaural sound-locator, known as the 'Claude Orthophone', used by the French Army for detecting enemy guns and machine-guns. When the design of sound-locators began in this country, under the direction of Professor A. V. Hill in the Anti-Aircraft Experimental Section of the Munitions Inventions Department, the Claude Orthophone seems to have provided a starting-point. The British instrument made use of two pairs of trumpets. One pair, fixed parallel, at the ends of a horizontal arm, rotated about a vertical axis under the control of the listener who moved the trumpets until the sound appeared to come from in front (or behind). The listener then knew that the source of the sound was somewhere in the vertical plane symmetrically situated between the two trumpets. The second pair of trumpets rotated about a horizontal axis carried by the first pair. A second listener adjusted the second set of trumpets until the sound appeared to be directly in front of him, and thus obtained the angle made by the direction of the sound with the horizon. In other words, the two pairs of trumpets enabled the observers to obtain the direction of the target in elevation and in azimuth. Corrections then had to be made for the so-called 'sound-lag', and these were effected by a simple device, called a 'ring-sight', designed in the Anti-Aircraft Experimental Section. The direction finally obtained was signalled to the searchlight operators who at

once searched for the target. A defect of this type of locator was the difficulty experienced in trying to eliminate extraneous sounds, such, for instance, as came from nearby motor-cars. The Munitions Inventions Department experimented with many other types of sound-locator during the war, but only one of these calls for notice. This was employed on the south-east coast and made use of a concave surface cut into the face of a cliff. The sound waves were collected by the instrument, at their point of maximum concentration. This type of locator proved of value in giving warning of the approach of German bombing aircraft from Belgium: they were sometimes detected as far away from the coast as fifteen or twenty miles.

Barrage Fire

A period of quiet had followed the attack of the 4th/5th of September, owing chiefly to a break in the weather. It was during this time that the new scheme of anti-aircraft gun-fire, to which reference has been made in the extracts quoted from Major-General Ashmore's book,¹ was devised. Two zones were established in which the defence aeroplanes were forbidden to fly: one, the so-called *Silent Zone*, was on the enemy side of the outer line of guns, and the other was in the immediate London area. Any aircraft heard or seen within these areas could be treated as hostile and the anti-aircraft gunners could fire, unhesitatingly, at sight or sound. There was much discussion about the form the fire should take and Lieutenant-Colonel Simon and Captain A. R. F. Kingscote worked at a scheme which aimed at placing a series of 'curtains' of shell bursts in the path of the invisible raiding aeroplanes. The scheme, when ready, allowed for barrage fire which would give screens of shell bursts about 2,500 feet from top to bottom. The screens could be ordered for five different heights, varying between 17,000 and 5,000 feet and classified as 'very high', 'high', 'normal', 'low' and 'very low', normal being what was known as the 'conventional' height of 10,000 feet. The map used by the anti-aircraft gunners was divided into numbered squares, and as the enemy

¹ See p. 66.

aeroplanes were shown, according to sound-plotting, to be about to enter a particular square, the controlling officer directed vertical barrage fire on the face of that square. As the bombers passed from square to square in the barrage zones they would be met by successive barrage screens. If, however, a target was found by a searchlight beam, the barrage fire was to cease and direct shooting was to begin. There was just enough opportunity to set in train the preliminary arrangements connected with this type of fire before the next series of raids began.

CHAPTER II

GERMAN AIR RAIDS ON GREAT BRITAIN

1917-1918 (*Concluded*)

The Harvest Moon

THE moon reached its first quarter on the 24th of September 1917, and on that night began a series of attacks which remained more vividly than any others in the memory of most of those who lived through the air raids on England.

Map 14 On the 24th the moon set at 10.21 p.m., and by that time the bombers were clear of the country. Sixteen Gothas had come in at intervals from 7 p.m., at heights of about 8,000 feet, between Dover in the south and Orfordness in the north, with London for objective, but no more than three had attacked the capital. The bombs on London were scattered over a fairly wide area and they destroyed houses and shops: fourteen people were killed and thirty-six injured by bombs, and thirteen more were injured by anti-aircraft shells. Most of the casualties (thirteen killed, twenty-six injured) were caused by one high explosive bomb which burst at the entrance to the Bedford Hotel in Southampton Row. The crew of one of the Gothas reported on their return that they believed they had hit the Admiralty buildings, and, making allowance for the darkness and for the height at which they flew, they were little out in their reckoning. One of the bombs from this Gotha fell in the Thames opposite St. Thomas's Hospital, another in Dean's Yard, Westminster, and a third in the Green Park near the Ritz Hotel. A bomb which struck Burlington House passed through the roof of No. 9 Gallery into the basement and caused damage to the building and to some statuary.

Outside London the greatest effect was obtained at Dover, where fifty-five bombs fell. They killed five people and injured eleven, and caused damage to houses, a chapel, and a gas-works. Other bombs exploded at various places in Kent and Essex, but, except at Leybourne camp, they did no harm. On the camp, and on the nearby villages of

East and West Malling, sixteen bombs were dropped: two soldiers in the camp were killed and ten injured.

None of the thirty British pilots who went up during the raid encountered the enemy, and although it seemed that one Gotha was brought down by anti-aircraft gun-fire in the Thames off Sheerness, the German records show that all the bombers returned. One, however, crashed near its home aerodrome, and as the evidence is strong that a Gotha was hit over the Thames it is possible that the aeroplane which crashed had received some damage.

Not long after the last of the aeroplanes had gone, the east coast, from Norfolk to Yorkshire, was responding to the alarm of Zeppelins. Ten airships, led by Fregattenkapitän Strasser, crossed the North Sea during the afternoon of the 24th and kept a rendezvous off Flamborough Head.¹ According to our observation no more than five of the airships dropped bombs on land, but the German official records show eight Zeppelins attacking land targets and two bombing ships at sea. Map 4

The *L.55* (Kapitänleutnant Flemming) came in at Bridlington at 12.15 a.m. and cruised, seawards of Scarborough, to Whitby. After circling Whitby she went on searching, so it seemed, for the works at Skinningrove, a favourite objective for airship attack. About 1.40 a.m. Flemming bore down on Skinningrove from the direction of the sea and dropped six bombs which exploded harmlessly four miles south of the works. The *L.55* was then found by the Skinningrove searchlight, and anti-aircraft gun-fire was opened, but the black paint on her underside made it difficult for the searchlight operators to hold her. While she was illuminated, however, she was seen by Second Lieutenant W. W. Cook, a Royal Flying Corps pilot in a B.E.2e, who estimated her height at 16,000 feet. He gave chase, but a strong westerly wind was blowing and the airship soon disappeared after she turned out to sea. Additional bombs from the *L.55* fell in the sea near Staithes.²

¹ An eleventh airship, the *L.52*, set out, but she had engine trouble and turned back.

² Flemming thought his attack was made on Hull. He refers to the

The *L.41* (Hauptmann Manger) attacked Hull. She came in over Hornsea at 1.27 a.m., crossed to Beverley, and then followed the railway to Hull, the usual way of approach to the city by Zeppelins. The *L.41* crossed Hull, at full speed, from north-west to east and, at 2.40 a.m., dropped sixteen bombs which caused injury to three women, but inflicted little damage. The airship passed over the river and came in again above the east side of the city, dropping four more bombs in a field at Marfleet. She then went on towards Paull, where she came under fire, after which she turned off in a north-easterly direction. Four more bombs came from her as she passed near Preston.¹ Second Lieutenant W. W. Cook, who was flying south after his brief pursuit of the *L.55*, saw the Paull searchlight and then detected the outline of the *L.41*. He was over Beverley at the time, at 14,500 feet, with the Zeppelin at about 16,000 feet. He made for the airship, but lost her as soon as the Paull searchlight was switched off. He then steered for the coast in the hope of finding one of the returning raiders and, after a trying patrol, ten miles off the coast, he caught sight of an airship at sea east of Hornsea about 3 a.m. He gave chase, but could not force his B.E.2e to the height of the Zeppelin. At a range of about 800 yards, however, he fired four drums at the stern of the Zeppelin, but there was no visible result and, after vainly pursuing her until he was sixty miles out to sea, he gave up the chase and returned. So far as can be judged his attack was made on the *L.42* (Kapitänleutnant Martin Dietrich). This ship, which had had engine trouble, turned home after dropping bombs on what appeared to be shipping off the Humber. Dietrich in his official report refers to aeroplanes being seen below the ship, and although he does not say that he was attacked, he found, on his return to his base, that there were two bullet holes in one of the gas-cells. He gives his height,

searchlights and to heavy anti-aircraft fire, but he did not, apparently, see the aeroplane.

¹ Manger, in his report, says Hull was clearly outlined. He dropped his bombs (one 300-kg., five 100-kg., ten 50-kg., and twenty incendiaries) in two loads from 16,600 feet.

when he dropped his bombs, as 18,300 feet. Second Lieutenant Cook had been ill-rewarded for his two fine attempts to attack the airships, and the escape of one of them—the *L.42*—may be said to be due to the fact that the B.E.2e was outclassed in speed and ‘ceiling’ by the latest type Zeppelins.

The *L.46* (Kapitänleutnant Hollender with Strasser aboard) came a few miles inland, south of Grimsby, and eventually dropped the majority of her bombs near the Lincolnshire village of Cuxwold. What attracted her commander were lights showing on a landing ground of the Royal Flying Corps, but the bombs fell in fields and no damage was done. The *L.46* then turned east and went straight out to sea, south of Spurn Head, about 3 a.m.¹

The *L.53* (Kapitänleutnant d. R. Prölss) was making for Sheffield, but strong head-winds impeded her and she attacked the Boston district of South Lincolnshire; her bombs fell in open country and caused neither damage nor casualties.

The boldest flight was made by the *L.35* (Kapitänleutnant Ehrlich) which was over land from 12.5 a.m. to a little after 4 a.m. Her commander seems to have made a determined effort to find a suitable target before dropping his bombs. The night was cloudy and the *L.35* flew at a great height: it was, therefore, difficult to pick out important objectives. About 2.30 a.m. the airship was making direct for Barnsley, but lights to the south brought about a change of course. These came from the Parkgate iron and steel works and from Silverwood colliery, north of Rotherham. They were not put out until receipt of a late warning five minutes after the *L.35* had altered course. The sudden extinction of the lights, however, undoubtedly saved the works from severe bombing. The best the airship commander could do was to drop his bombs in a long line across the ground where he judged the lights had been displayed.² From Thurnscoe

¹ Hollender's report shows that he was attracted by the lights, but he thought they indicated the town of Grimsby. He was under the impression, therefore, that his attack was made on the town.

² Ehrlich, in his report, says the target was well lighted and that the

to Rycroft twenty-five bombs fell in succession, but they missed their targets and the only damage was to glass and to a wall.

There were no casualties for the whole raid, other than the three women injured at Hull, and the material damage, as mentioned, was slight. Nor is there any record of ships at sea being attacked. In all, four naval and thirty-three military aeroplanes were sent up, but only Second Lieutenant W. W. Cook came within reach of the enemy. All pilots were handicapped, as were the airship commanders, by the low clouds and by the strong westerly wind. One aeroplane, apparently blown out to sea, was lost with its pilot and observer, and two other aeroplanes crashed and killed an observer and injured a pilot. So far as could be judged none of the Zeppelins flew under 16,000 feet, a height at which they were safe from the majority of the aeroplanes which ascended.

Next night, the 25th of September, an aeroplane attack was made with London as the objective, but the bombers *Map 15* were not long over England. Fifteen Gothas came in between 7 p.m. and 7.30 p.m. and they had all left again by 8.35 p.m. Three of them attacked the south-eastern districts of London, but the remainder bombed East Kent between the North Foreland and Folkestone. The bombs on Kent (about 34) damaged a house and injured a soldier, but otherwise exploded without harm. In London, Camberwell and Bermondsey suffered most, but the casualties were not high if account is taken of the crowded nature of the districts attacked. Six people were killed and twenty injured as a result of the bombing, and three were killed and three more injured by anti-aircraft shells. Twenty pilots went up, mostly in B.E.'s and F.E.'s. One pilot of No. 78 Squadron was fired at by a Gotha at 9,400 feet near Joyce Green, and he thereupon turned to pursue the enemy aeroplane, the rearmost of three, and kept up a running fire for ten minutes until she disappeared. It is known that one of the Gothas failed to

lights were extinguished as soon as he began his attack. He was trying to reach Sheffield, but the wind was too strong. He correctly estimated that he was near Doncaster.

reach home and was, presumably, lost at sea. According to German information this aeroplane was shot down by gunfire, but most of the anti-aircraft guns which came into action fired by sound, and very few gunners so much as obtained a glimpse of their target: none of them claimed to have made a hit.

There was a respite for two days and then, beginning on the 28th of September, raids were made on four successive nights. Twenty-five Gothas and two Giant aeroplanes (the first of this type to visit England) set out on the 28th to bomb London, but fifteen Gothas turned *Map 16* back because of heavy clouds, and one owing to engine trouble. German accounts do not show whether any of these reached England before deciding to give up the raid, but according to our observation at the time about twenty German aeroplanes crossed the coasts, although few of them dropped bombs. The actual attacks were made, between 7.30 p.m. and 10 p.m., on the Thames Estuary, on the counties of Kent and Essex, and on the district north of Harwich. About forty-four bombs were traced; they caused no casualties and little damage. Twenty defence pilots left the ground, but owing to the thickness of the cloud-banks they saw nothing of the enemy. Difficult as the conditions were, the anti-aircraft gunners claimed some successes. Two aeroplanes which approached Deal at 8.47 p.m. were heavily engaged by guns on shore and in ships. The Deal gunners reported that a shell hit one of the two bombers and that the damaged aeroplane appeared to fall into the sea: what is certain is that the enemy aircraft disappeared without dropping any bombs. H.M.S. *Marshal Ney* also claimed that she had brought down a bomber off Ramsgate as it was coming in at 7.50 p.m. Yet another success was reported. Three bombing aeroplanes which passed along the coast of Sheppey were fired at soon after 8 p.m. and the anti-aircraft gunners at Port Victoria and Neats Court confidently stated that one of the bombers was shot down off Barton's Point. A search was subsequently made, but no trace was found of any of the aeroplanes reported to have been shot down. It is now known, however, that three

Gothas failed to return from the attack on this night and the credit for their destruction may therefore be ascribed to the gunners mentioned. The German bombing squadron suffered yet more heavily, for it is also revealed that of the Gothas which returned to Belgium six were wrecked on landing.

Map 17 Although the attack next night, the 29th, was less ambitious in conception, London suffered heavily. Seven Gothas and three Giant aeroplanes took part, all of them with London for objective. At the time, we were under the impression that at least eighteen aeroplanes crossed the coast and that many of them were driven back by gun-fire without dropping any bombs. Of the total of fifty-five bombs which we were able to trace, thirty fell on various places in Kent, notably on Sheerness, where one soldier was injured and the railway was damaged. The Uplees Powder Works, north of Faversham, had a narrow escape from four high explosive bombs which buried themselves in the mud close to the works.

There were clouds over London and the visibility generally was poor, but so far as could be judged the capital was bombed by four aeroplanes between 9.10 p.m. and 9.45 p.m. Most of the damage done was to house property, particularly in the Notting Hill, Kingsland, and Kennington districts. Two bombs which fell on Waterloo Station did hurt to nobody, but they damaged the permanent way and rolling stock. The casualties in London, due to the bombing, were twelve killed and sixty-two injured.

Nearly as much damage was done by anti-aircraft gun-fire as by bombs. No fewer than 12,700 shells, in barrage fire, were sent up by the anti-aircraft gunners, about half of them by the inner and outer London defences. They killed two people and caused injury to twenty-four, and damaged 290 houses, about half of them seriously. One Gotha was brought down in flames by anti-aircraft fire as it was coming in at Dover, and another, for some reason unknown, made a forced landing in Holland. Thirty defence aeroplanes took the air, but there were no combats.

On the 30th of September, with the moon at the full, *Map 18* the activity began about 6.40 p.m. and continued, intermittently, until 10 p.m., when the last enemy aeroplane was clear of the country. The bombers came in at intervals and were heard over much of the coast-line between Dover and Clacton. It was difficult to follow their movements, but it was concluded that some twenty-five aeroplanes took part in the raid, and that eight of them reached the London district. It is now clear that the main raid was made by no more than ten Gothas, and that there was a subsidiary attack on Dover by one smaller type aeroplane. It appeared to the various German crews that their attack on London had been one of the most effective made up to that time, and that the city, the Admiralty, and Thameside warehouses, had been hit. In fact, the material damage was comparatively slight (£7,600 by bombs and anti-aircraft gun-fire), and was chiefly caused to houses in the east London area. The Midland Railway cleaning sheds at West Ham were hit, and three locomotives, the sheds, and nearby houses were damaged. Elsewhere, Poplar (1 killed, 9 injured) and Highgate (5 injured) suffered most. The total casualties in the London area were one killed and seventeen injured.

Margate was also bombed rather heavily (16 bombs), and several houses were damaged: the casualties were 11 killed (including 5 soldiers) and six injured. About twenty-six additional bombs fell on various places in Kent, and three at Thorpe Bay, Essex, but they were ineffective. The smaller type bomber which attacked Dover dropped only four 12-kg. bombs which slightly damaged the Dover Engineering Works and injured one man.

Once again the anti-aircraft gunners were compelled to fire by sound as the targets were seldom or never visible. They fired a total of 14,061 rounds which killed two persons and caused injury to fourteen in the London district, and did minor damage to property. The German crews, in their reports, make reference to the heavy bombardment to which they were subjected, but there is no doubt that the barrage fire appeared to be far more effective than in fact it was. It seemed at the time, for

instance, that the vigorous fire of the guns in the Chatham area forced 'several' enemy pilots to abandon the idea of proceeding to London. There is some evidence that one Gotha turned back and bombed Margate, but most of the bombers came overland across Essex, not Kent.

At a meeting of the War Cabinet held the following day, Lord French brought forward for urgent decision the question of replacements for the 3-inch 20-cwt. guns in the London area. The life of each gun was stated to be no more than 1,500 rounds, and during the recent raids a total of 27,300 rounds had been fired. He also urged the provision of more guns to complete the London barrage. It was decided that a committee, under the chairmanship of Lieutenant-General J. C. Smuts, should meet the same afternoon to inquire into these questions, and about the supply of anti-aircraft ammunition.¹

The War Cabinet proceeded to discuss the possibility of making air raids into Germany. The Press, it was stated, had for some time been fostering a strong agitation for reprisals, and it seemed that the feeling of the public favoured immediate counter-attacks. Furthermore, although the damage to life and property as a result of the moonlight raids was small, the military consequences were not inconsiderable. Mr. Winston Churchill, the Minister of Munitions,² made this clear when he placed before the meeting a memorandum which showed how the recent raids had affected the output of munitions at Woolwich Arsenal ('typical of what was taking place over a wide area'). The paper showed that for the night-shift of the 24th/25th of September 1917 the position in the filling factory was as shown in the table opposite.

It will be noticed that the loss of output was out of all proportion to the percentage of employees who stayed away from work.

¹ The Committee consisted of Lieutenant-General Smuts, the Minister of Munitions, the President of the Air Board, the Director-General of Military Aeronautics, the Master-General of Ordnance, and the General Officer Commanding London Air Defence Area. The First Sea Lord and the Fifth Sea Lord also attended.

² Mr. Churchill became Minister of Munitions in July 1917.

	<i>Percentage of hands present.</i>	<i>Actual Output.</i>	<i>Normal Output.</i>
	per cent.		
0.303-inch	27	140,000	850,000
7.62-mm.	47	60,000	300,000
Rifle grenade cartridges	27	34,000	125,000

Next night, the 25th/26th, when the bombers were over England only about 1½ hours, there was some improvement as follows:

	<i>Percentage of hands present.</i>	<i>Actual Output.</i>	<i>Normal Output.</i>
	per cent.		
0.303-inch	64	283,000	850,000
7.62-mm.	78	132,000	300,000
Rifle grenade cartridges	64	65,000	125,000

Although the raids took place at night they also affected the day-shift output as these figures for the 25th of September showed:

	<i>Actual Output.</i>	<i>Normal Output.</i>
0.303-inch	640,000	850,000
7.62-mm.	212,000	300,000
Rifle grenade cartridges	103,000	125,000

It was stated at the War Cabinet meeting that, owing mainly to the attitude adopted by the Press, a feeling of insecurity had been engendered in the capital, and that if counter-attacks could be successfully organized there was good reason to suppose that the morale of munition workers in Germany might be equally affected. After much discussion the Cabinet decided that the committee which had been appointed to inquire into the anti-aircraft gun problem should also explore the general question of counter bombing attacks. The committee was directed to report as quickly as possible, particularly on the questions of organization, the formations to be adopted, the

types of aeroplane to be used, the times most suitable for the attacks, and the nature of the attacks by naval or military aircraft.

Sir William R. Robertson, Chief of the Imperial General Staff, also undertook to see Major-General Trenchard next day to find out whether it would be possible for Sir Douglas Haig to spare one squadron, temporarily, for long-range counter bombing. He accordingly wired to the Commander-in-Chief as follows: 'Continuous aircraft raids on England are causing interruption in munitions work and having some effect on general public. Cabinet desire immediate action against those German objectives which can be reached from neighbourhood of Nancy. Send Trenchard over at once to me to discuss scale on which you can undertake these operations and necessary arrangements for them. Cabinet wish for at least one squadron to be employed and with least possible delay.'

The meeting of the War Cabinet, at which these various decisions had been made, had not long broken up when the German bombers were again over England on the last raid of this series. The moon, one day after the full, was above the horizon all night on the 1st/2nd of October and the weather conditions generally were good, although disturbances were on their way from the Atlantic. *Map 19* Eighteen Gothas crossed in relays between 6.50 p.m. and 10 p.m. and about eight of them succeeded in reaching London, although two passed from Tottenham to Woolwich without dropping any bombs. The others dropped about twenty-eight bombs on Hyde Park, Belgravia, Pimlico, Euston, Highbury, Haggerston, Shoreditch, Hoxton, and Edmonton, as a result of which ten persons were killed and twenty-eight injured, and between 600 and 700 houses were damaged. In addition, thirty-eight bombs fell on places in Kent, eight in the sea off Landguard in Suffolk, and seven at Walton-on-the-Naze. None of the bombs outside London caused casualties, and the damage was slight.

Eighteen pilots went up, but they had no encounters. Although no more than one gun detachment caught a glimpse of the enemy (two aeroplanes), a total of 10,532

barrage rounds were fired. One woman was killed and thirteen persons were injured by anti-aircraft shells in London, and a soldier was injured at Landguard.

This attack served to emphasize the serious position which had been reached with regard to the wear and tear of the anti-aircraft guns, and to the heavy expenditure of ammunition. It had been found necessary to cut down the volume of fire directed against the raiders, and Lord French, at a Cabinet meeting on the morning of the 2nd, pointed out that some guns were already useless, and that if the raids continued on the scale of the past week it would only be a matter of a few months before the gun defences of the London area ceased to exist.¹ Mr. Winston Churchill reported that he had undertaken, on behalf of his Department, to re-line twenty 3-inch 20-cwt. guns a month.² The Cabinet decided that, as the situation with regard to hostile submarines was improving, while the air position was getting worse, the output of 3-inch guns for the next month should be placed at the disposal of Lord French, and that four guns immediately available for mounting in merchant ships should be diverted to the London defences. Arising out of this decision the Admiralty gave up sixteen 3-inch guns to help complete the outer barrage and subsequently increased this number to thirty-eight.³

Another matter considered by the Cabinet was a tendency of a section of the public, particularly in the eastern quarters of London (which had suffered most in the raids), to give way to panic. When the first raid of the series had been made, on the 24th of September, a concourse of people, estimated at about 100,000, had rushed to take shelter in the underground railways. On each subsequent night, whether raids were made or not, the

¹ Orders were given, shortly afterwards, for reduced-charge ammunition to be used by the guns in the London area. Following this order a new type of barrage, supplementary to the barrage on the sides of the squares, was devised. See map, facing.

² The War Office also undertook to provide 30,000 rounds of ammunition a month and to build up, in addition, a reserve of 100,000 rounds.

³ Sixteen of these guns were taken from those which had been allotted to merchantmen, and twenty-two were taken from Fleet reserve.

numbers grew to a maximum estimated total of 300,000. People took up their places as soon as darkness set in, or even before, prepared to camp out until all possibility of danger had passed. They blocked the stairs and the platforms, and the majority of them, it was said, did not prove amenable to the efforts of the railway officials to distribute them to the best advantage. The suggestion was made at the Cabinet meeting that the feeling of panic was fostered by publication in the newspapers of illustrated articles depicting air-raid damage, and it was arranged that the Prime Minister should see the editors of the leading newspapers and ask them to cease to publish descriptive accounts and pictures of air-raid destruction.

The Cabinet then passed to the question of the bombing of Germany. Lieutenant-General Smuts reported that his committee, appointed the previous day, had already met and that the details of offensive operations were being worked out with the least possible delay. He explained that Major-General Trenchard was on his way from France and would be available for consultation in the course of the next few hours, but that meanwhile arrangements had been made for one squadron of long-range bombing aeroplanes to move to an aerodrome near Nancy. The First Lord of the Admiralty reported that eight naval Handley Page aeroplanes were also being sent to operate from the same aerodrome.¹

Later the same day the Cabinet met again to discuss with Major-General Trenchard, who had arrived from France by air, the points raised during the meeting of the morning. The Chief of the Imperial General Staff explained that, in addition to the Handley Pages, twenty D.H.4 aeroplanes which were lying in cases ready for dispatch to Russia would be made available for the raids on Germany, and that twenty more, from the same source, would be ready within six weeks. Major-General Trenchard said that the aeroplanes would go to an aerodrome already provided at Ochey, near Nancy, and he anticipated that

¹ The Handley Pages were withdrawn from the Yorkshire coast, where they had been doing useful work in search of U-boats in the area of the Tees.

they would be ready to begin the bombing offensive six days after arrival. The Prime Minister took the opportunity to impress upon Major-General Trenchard the importance of making a success of the operations because of the effect success or failure would have on the morale of the people at home. As a result of the arrangements arising out of these Cabinet meetings, a bombing wing, the Forty-first, was organized to operate from Ochey: it became the forerunner of the Independent Force.¹

While these decisions were pending, the weather was unsettled and there was a lull in the bombing campaign against England. South-eastern England, and London in particular, had had a troubled time. Much of the bombing had, by chance, been ineffective, but that was the only thing about which there was cause for satisfaction. The new form of anti-aircraft barrage fire had been of some value in deterring the raiders, but was not so effective as we thought at the time. Most of the thousands of shells which lighted patterns across the sky exploded well away from the swift-moving aeroplanes to which they were, it seems, less of a menace than to the people and property below. It must, however, be pointed out that the public had not yet fully realized the necessity to take cover from the shells as well as from the bombs. Furthermore, the nineteen French 75-mm. guns in the London area had proved particularly dangerous because they fired shrapnel and the shell cases fell to earth intact. These guns were moved to Birmingham which was not, at the time, considered liable to aeroplane attack.

The pilots who went up to fight the raiders had little to show for their gallantry. They suffered the risks and the discomforts without the compensation of striking a blow at the enemy. Very occasionally a pilot found himself near one of the bombing aeroplanes, but only for an instant. A quick manœuvre and the enemy was away, lost in the darkness. The bombers were seldom seen from the ground and were not, therefore, illuminated by searchlights, so necessary if the pilots of the defence were to be given

¹ The activities of this wing, with those of the Independent Force, are dealt with in Volume VI.

opportunities to attack. Apart, however, from these considerations, there was the overriding fact that most of the aeroplanes sent up to fight the enemy were not good enough for the task. Only a few of the single-seater fighting pilots had as yet mastered the difficulties associated with manœuvring and landing unstable aeroplanes at night. Such types as the B.E.2c and others of the B.E. series (except possibly the single-seater B.E.12), the F.E.2b, and the Armstrong-Whitworth, would have had no advantages over the Gothas in close combat, and in any event their comparatively slow speed and rate of climb, as well as their low 'ceiling', gave them little chance to get within striking distance.

The October Airship Raid

Maps 5 and 6 Before the Hunter's moon brought out the aeroplanes again, the German naval airship service made an attack which has more of the stuff of curiosity and tragedy in it than any other of its kind attempted during the war. On the 19th of October eleven naval Zeppelins journeyed across the North Sea: they were the *L.41*, *L.44*, *L.45*, *L.46*, *L.47*, *L.49*, *L.50*, *L.52*, *L.53*, *L.54*, and *L.55*.¹ As they cruised westwards, the movements of six of them were followed fairly closely by the Admiralty and, at 4 p.m., a warning was distributed from Whitehall in which it was stated that the indications pointed to an airship attack on districts in the midlands and in the north.

On the evening of the 19th Great Britain lay between a centre of high pressure over the Bay of Biscay and south-west France, and two low pressure areas over Iceland and over Southern Scandinavia. The Icelandic depression was deep and was rapidly approaching our north-western shores. There was a superficial calm over England and the North Sea, and up to about 10,000 feet the winds were light, not greater than twenty miles an hour, but above that height the strength of the wind doubled and, at about 20,000 feet, a gale was raging from the north and north-west. At the height at which the Zeppelins moved across the sea

¹ Two other ships, the *L.42* and *L.51*, should have taken part in this attack, but they could not leave the fixed sheds at Nordholz because of cross-winds.

there were no indications of the troubles to come, but as they approached the English coast they climbed to 12,000 feet or so, where they met unexpected winds from the north. To avoid aeroplane attack and anti-aircraft gunfire, they ascended still higher to 16,000 feet or more, where they came within the grip of the gale.

The acoustic conditions were peculiar and to listening ears in England sound was deadened. The noise made by the engines of the Zeppelins was possibly carried away on the wind. Certainly they were almost inaudible from the ground and there was a widespread belief that, to escape notice, the airships drifted with the wind, across England, with engines cut off. Because of this belief, and because the London guns withheld their fire, the attack of this night has usually been referred to as the 'silent' raid. It may be said, however, that had the engines been stopped they would have frozen at the heights at which the Zeppelins flew: in several instances, indeed, when engines failed through accident or negligence, they did immediately freeze. It was not only from the upper air that sound failed to carry. Bombs exploded with a deadened noise and were often believed to have fallen far away when they were quite near. The explosion of bombs at Hertford was heard only faintly at neighbouring gun stations, and not at all at Theydon Bois. Harwich heard nothing of bombs at Wix, eight miles away, while people in the village of Great Oakley, only three miles from Wix, estimated that the bombs had exploded in distant Colchester.

The objectives allotted to the Zeppelin commanders were industrial centres in the Midlands, but the wind had already begun to exert its effect before the airships made their landfall. A group of six came in between the Humber and the Wash, and the remaining five crossed the coast at various points in Norfolk. Only one ship succeeded in going back direct across the North Sea. Of the others, two returned to Germany along the Dutch coast or across Holland, four passed over the trench system between Ypres and Lunéville, and the remaining four, the *L.44*, *L.45*, *L.49*, and *L.50*, were blown far southward over France and never saw Germany again.

The ship which went home direct was the *L.54* (Kapitänleutnant Freiherr von Buttlar). She came in over the Norfolk coast at Happisburgh about 8 p.m., cruised southwards down the coast, passed inland south of Ipswich, and went out again about 9.20 p.m. near Clacton-on-Sea. We traced thirteen bombs from her, but they did no damage. She hugged the coast as she moved northwards again and, near Yarmouth, when flying at 5,000 feet, was seen in the distance by a naval pilot who was nearly 4,000 feet higher. He dived to attack the Zeppelin, but he could not get into firing position because of her greater speed, and although he pursued her out to sea for twenty minutes he could not overtake her. Buttlar, the only commander to take his ship home by way of the North Sea, was enabled to do so because he flew at a height untroubled by the gale from the north.

The two Zeppelins which went home by way of Holland were the *L.46* and *L.47*. The *L.46* (Kapitänleutnant Hollender) was over land, in Norfolk, for no longer than twenty minutes and her twenty bombs inflicted negligible damage. The *L.47* (Kapitänleutnant von Freudenreich) made a longer journey over England. She came in at Sutton-on-Sea in Lincolnshire, went inland to Rutland, and then south-eastwards to the coast again near Walton-on-the-Naze. During her three hours' flight she dropped seventeen bombs, without effect.

The Zeppelins which got back to Germany across the trenches in France were the *L.41*, *L.52*, *L.53*, and *L.55*. The *L.41* (Hauptmann Manger) came farthest inland. She passed the Spurn at 7.5 p.m. and, two hours later, was near Derby, where she circled for some time, but she missed the city itself and, at 10.50 p.m., appeared west of Birmingham and dropped her main load of bombs between Netherton and Barnt Green. The only damage done was at the Austin Motor Works at Longbridge, which had first received warning of the raid when the airship was near at hand and were still showing lights when she appeared. Three of five bombs which fell near the works failed to explode, but the others did minor damage, estimated at £500, and caused injury to one man. The *L.41* then

steered a south-easterly course, passed over the Thames Estuary, crossed a part of Kent, entered France near Gravelines, and finally passed over the British trenches near La Bassée about 4.50 a.m.¹

The *L.52* (Oberleutnant zur See Friemel) made a somewhat similar journey except that she did not get so far inland. She came in at Mablethorpe on the Lincolnshire coast at 7.30 p.m., was near Northampton at 8.50 p.m., and then headed south towards London. She did not, however, reach the capital, but turned off in an easterly direction near Aylesbury. She dropped twenty-nine bombs, mainly near Hertford (13) and on Waltham Marshes (13), which injured a man and damaged some cottages. Soon after the Waltham bombs fell, the *L.52* was seen by a Royal Flying Corps pilot, but he was in a B.E.2e, and could not climb to the height of the Zeppelin (15,000–16,000 feet). She crossed the French coast near Etaples, was blown rapidly across France, and eventually disappeared over the trenches, near St. Dié, into Alsace: she landed at her base at Ahlhorn in the afternoon.

The *L.53* (Kapitänleutnant d. R. Prölss), the earliest ship to come in, passed over the Norfolk coast at Blakeney at 6.45 p.m., crossed Norfolk, Suffolk, Essex, the Thames Estuary and Kent, and then appeared over France. She was at Nancy about 3 a.m. and finally went into Germany near Lunéville. Only eleven bombs from her were traced on English soil, and the result was slight damage to an inn. The *L.55* (Kapitänleutnant Flemming) was one of the ships which passed near London. She entered over the Lincolnshire coast at 7.30 p.m., dropped her first bombs (6) at Holme, south of Peterborough, and then, following the line of the Great Northern Railway at high speed, dropped seventeen bombs between Hitchin and Hatfield. A man was slightly injured and minor damage was caused. The *L.55* then passed westwards of London and finally out to sea at Hastings without dropping any

¹ In the circumstances the journey made by the *L.41* showed that the ship was well handled. Manger thought his attack was made farther north, on Manchester, and he refers, in his report, to lighted factories. He bombed from about 16,500 feet.

more bombs; she eventually reached Germany by way of Laon, but she suffered some damage on landing in a clearing in a wood at Tiefenort.¹

So much for those which reached home. The remainder had remarkable journeys. The *L.44* was commanded by Kapitänleutnant Stabbert, an officer who has found frequent mention in this history. She entered the Wash at 7.30 p.m., passed west of Peterborough an hour later and, soon after 9 p.m., was near Bedford. An engineering works and a military training school, which had not received warning, were showing full lights, and these no doubt attracted the ten 50-kg. bombs which fell between Elstow and Kempston: two men were injured in the engineering works, where glass was smashed by the concussion of the bombs, but the damage otherwise was slight. By the merest chance, however, a large ammunition dump in the neighbourhood narrowly escaped destruction. Bombs bracketed the dump, but two of them failed to explode. The next bombs from the *L.44* fell near Leighton Buzzard, but although they numbered ten and included one of 300-kg., the damage was confined to window-glass. It appeared that the Zeppelin was bearing down on London, but she kept a south-easterly course, passed over the Lea Valley and Epping Forest to the Thames near Gravesend, dropped more bombs harmlessly near Maidstone in Kent, and then went out to sea east of Folkestone at 11.30 p.m. Twenty minutes later she was over Boulogne and, after a long south-easterly journey across France, appeared, at 6.15 a.m. on the 20th, near St. Clément, where she came under fire from French anti-aircraft guns stationed at Vathiménil. When first seen, her height was estimated at under 12,000 feet, but when fire was opened she began rapidly to climb until the gunners were firing to reach a height of 19,000 feet. A tracer shell pierced the Zeppelin which caught fire and was destroyed with her crew.

¹ Although Flemming knew he passed west of London, his general course was much farther south than, and not so far west as, he thought. He was under the impression that he bombed Mappleton, Hull, and Birmingham.

The *L.45* (Kapitänleutnant Waldemar Kölle) bombed Northampton and London. She left Tondern, near the Danish frontier, at 11.25 a.m. on the 19th of October and ended her career near Sisteron, in southern France, at 10 a.m. on the 20th. As one of her crew put it, he had travelled from Denmark to the Riviera by way of London and Paris in about twenty hours. The airship came in over the Yorkshire coast at Withernsea at 8.20 p.m. and, for about an hour, circled without making much progress, possibly because of the presence of aeroplanes which had gone up an hour before when the *L.41* had appeared over the Humber. At 9.50 p.m. the *L.45* was in the neighbourhood of Leicester and she might have got no farther if a Royal Flying Corps officer who found her had been in a first-class fighting aeroplane. He was in an F.E.2b at 14,000 feet when he discovered the *L.45* about 1,000 feet above him. He fired three bursts which seemed to enter the Zeppelin, but she soon outdistanced him. At 10.50 p.m. she had reached Northampton, in the neighbourhood of which twenty-three bombs fell. One woman and two children were killed in Northampton, but little damage was caused. It is of interest that the crew of the airship thought they had got much farther west in England and believed, when they were attacking Northampton, that their bombs were falling on Oxford. The *L.45* then followed the main line of the London and North Western Railway into London, where seven bombs fell. They killed thirty-one persons and injured forty-seven. In addition, much damage to shops and houses was caused in Hendon, Hampstead, Camberwell, and Lewisham. One bomb fell in Piccadilly Circus, opposite Messrs. Swan & Edgar's premises, and was responsible for many of the casualties. Deceived by the long time which had elapsed since the warning had been given, people had gone into the open, and as the *L.45* was neither seen nor heard during her passage across the capital, they had no opportunity to seek cover again: seven were killed (three of them soldiers) and eighteen were injured (including two soldiers, a sailor, and a police constable). Most damage, elsewhere, was caused at Camberwell, where a

300-kg. bomb destroyed three shop buildings and damaged about two hundred houses; ten people were killed and twenty-three injured. A bomb of the same weight exploded at Hither Green and killed fourteen persons and caused injury to seven: twenty-six houses were damaged. One of the helmsmen of the *L.45* subsequently wrote an account of his experiences. 'At about 11.30', he said, 'we began to see lights below, and as the lights continued 'so it suddenly dawned upon us that it could only be 'the city of London that we were crossing in the air. 'Even Kölle looked amazed at the dim lights as Schütz 'suddenly shouted "London!" It was then that we first 'realized the fury of the savage tempest that had been 'driving us out of our course. But Kölle clearly had but 'one thought—that was higher. So he released more bal- 'last and the bombs—first two sighting shots and then 'the rest. Over London! We had achieved what no other 'German airship had done since Mathy had bombed that 'proud city over a year ago! And his last trip across the 'City had proved his undoing.¹ Fortunately for us we 'were unseen; not a searchlight was unmasked; not a 'shot was fired; not an aeroplane was seen. If the gale 'had driven us out of our course, it had also defeated the 'flying defences of the city! It was misty or so it seemed, 'for we were above a thin veil of cloud. The Thames we 'just dimly saw from the outline of the lights; two great 'railway stations, I thought I saw, but the speed of the ship 'running almost before the gale was such that we could 'not distinguish much. We were half frozen, too, and the 'excitement was great. It was all over in a flash. The last 'big bomb was gone and we were once more over the 'darkness and rushing onwards.'²

Soon after midnight the *L.45* was found, just south of the mouth of the Medway, by Second Lieutenant T. B. Pritchard in a B.E.2c of No. 39 Home Defence Squadron. He was at 13,000 feet and estimated that the Zeppelin

¹ Mathy never crossed London on his final raid (1st of October 1916); he was brought down before reaching the capital.

² From an article, 'In a German Airship over England', in the *Journal of the Royal United Service Institution* for February 1926.

was 2,000 feet above him. He opened fire and the ship changed her course and ascended rapidly. She went out to sea near Hastings with Second Lieutenant Pritchard vainly pursuing her. He did not give up until she had disappeared from his view well over the Channel. On his return, the pilot, in a forced landing due to petrol shortage, crashed near Bexhill and was injured. At a great height, the *L.45* sped across France. At dawn her crew were surprised to see, against the distant sky, two other Zeppelins (the *L.49* and *L.50*). At 8 a.m. she passed over Lyons, and her commander probably then realized where he was, and he went off in a north-easterly direction with a view to making a landing in Switzerland. By this time three engines were out of action and no great headway could be made against the wind. At 10 a.m. the *L.45* was near Sisteron, and as there was little petrol left her commander tried to make a landing in the flat bed of the river Buèche which was almost dry. The *L.45* was, however, caught in an eddy of wind as she touched the ground and one of the cars, with two of the crew inside, was torn away. Two other members of the crew jumped from the after car, and the airship, thus lightened, rose again and was eventually dashed against the side of the valley, where the remainder of the crew jumped clear. After they had set fire to the ship the men marched away and surrendered to the French. The long journey, mostly made at a great height, had exhausted them, and to this fact the fate of the ship was partly due. Some of the crew had been repeatedly sick, and others complained of headaches and giddiness, while some had been unable to keep awake. Those whose duties kept them moving about the ship suffered most: one man had both his feet frozen black. The breakdown of one engine was due to a minor adjustment being badly made by a mechanic who was ill during the journey, and the breakdown of another was caused by the careless closing of a radiator cap, as a result of which the water was shaken out and the exhaust became red hot. It would appear, also, that the attack made by Second Lieutenant Pritchard over the Medway contributed to the downfall of the *L.45*. Up to the time

when he opened fire, the Zeppelin had been proceeding in an easterly direction, and had she kept anything like the same course would probably have reached home safely. Instead she turned, and went off due south.

One of the engines of the *L.49* (Kapitänleutnant Hans Gayer) went out of action before she made the English coast and, furthermore, her commander waited at sea for some time until the night became completely dark. The result was that the *L.49* drifted much farther south than was realized and she made her landfall at Holkham in Norfolk, and not at Scarborough as her commander believed. Forty-two bombs were dropped by the *L.49* on various places in Norfolk, but they did no more than kill cattle and cause minor damage to farm buildings. Eventually, at 11.9 p.m., the *L.49* passed over Folkestone, but her crew, to whom the town was clearly visible, thought they were crossing the Dutch coast. Next morning, about 8 a.m., she was attacked near Neufchâteau by a French squadron of five Nieuports (*Escadrille* No. 152) and was forced to land. An attempt was made by the crew to set fire to the ship, but most of them had suffered from height-sickness and all of them were so exhausted that they were in no condition to resist French onlookers, with the result that one of the latest-type Zeppelins fell intact into the hands of the French.

There remains the *L.50* (Kapitänleutnant Schwonder). She flew over Norfolk at 19,000 feet, dropped thirty bombs which exploded harmlessly in the open, and was then driven south by the high wind. One engine had failed over the North Sea, and another broke down over Norfolk, apparently because the mechanics were too ill to give it attention. The *L.50* reached friendly territory near Valenciennes, but her crew had lost idea where they were and she recrossed the trenches again in the Champagne. About midday on the 20th Schwonder saw the *L.49* on the ground below and, under the impression that Belgium, or possibly Germany, was beneath him, he gave orders to land. As he neared the ground, however, desultory rifle-fire was opened on his ship, and aeroplanes with Allied markings were noticed. The nose

of the Zeppelin went up again, but when she had reached a height of 10,000 feet an order was once more given to land. She descended steeply and, as she made to land, grazed the top of a wood with the result that the forward car was torn off by the trees. Sixteen men left the ship, some of them jumping from the side gondola. Thus lightened, the *L.50* shot into the air and disappeared. She carried with her two of her crew who had been stationed in the gangway, and two more who were in the rear gondola. The latter were probably injured because the car in which they were had crashed against the trees and had been knocked out of shape. The ship, out of control, became the sport of the winds. French pilots pursued her, but she went up to 23,000 feet, beyond their reach. She passed over Sisteron, and the crew of the *L.45*, prisoners of war, watched her as she swayed and dipped. At 5.30 p.m. the *L.50* crossed the coast near Fréjus, and she was pursued into the Mediterranean, until nightfall, by French seaplane pilots. As they turned for home, the airship was still careering helplessly southwards, and that was the last that was ever seen or heard of her or her luckless passengers.

There were no casualties or damage inflicted by the bombing other than what have already been noted, but although the Germans had little to show for their appreciable losses, it should be realized that things might have gone very differently. The defence system did not have much to do with the disastrous ending to the night's attack. The searchlights and the guns were of small use,¹ and not one of the seventy-three pilots who went up in England was equipped with an aeroplane capable of reaching the 'ceiling' heights of the Zeppelins. Had it not been for the unusual meteorological conditions there seems no reason why the airships should not have bombed at their will and have escaped. It is true that there

¹ Searchlights were uncovered in the London area, but no guns came into action; nor, in fact, were any Zeppelins seen. No more than twenty-two rounds in all were fired in England, two by H.M.S. *Albion* in the Humber, and the others by the guns at Cauldham (8), Cheriton (8), and Lympne (4). The airships were also fired at over France.

could have been little discrimination of targets, and it is true, also, that the height-sickness, from which most of the crews suffered, impaired efficiency. The fact remains, however, that had the Zeppelins come and gone without let or hindrance, as they well might, the airship menace would, once again, have become a very live one. The Germans, no doubt, would have attacked during the winter whenever the weather conditions appeared favourable, and we might have been forced immediately to re-equip all the home defence squadrons with the best existing type of single-seater fighter. We should have been hard put to it to do this and would have found it still more difficult to train, in short time, night-flying pilots for this type of aeroplane. Because the October Zeppelin raid proved a fiasco, it has been too lightly dismissed as offering only additional proof that the airship had long ceased to be a weapon of attack. With characteristic doggedness, the Germans refused to abandon the idea of raiding England with airships, but the disaster of the 19th/20th of October could not be ignored, and we were little troubled by Zeppelins afterwards.

Renewed Aeroplane Attacks

At the end of October the aeroplane attacks were resumed. On the 29th the moon was one day before the full and the weather conditions over the Channel were good, but a depression was spreading from the west and the conditions were not favourable for an attack on England: the sky became overcast and the wind increased to gale strength. It appeared from the reports of British observer posts that three or four detachments of enemy aeroplanes, numbering perhaps ten in all, came overland by way of the mouth of the Crouch, the Blackwater, and the Thames Estuary. No more than eight bombs were dropped on Rawreth, Rayleigh, Hockley, and Burnham, as a result of which two cottages were slightly damaged. According to German information, however, only one aeroplane, a Gotha, attacked England. Two other Gothas set out to take part in the raid and possibly

came some part of the way to England, but they turned back and dropped their bombs on Calais.

At 4.30 a.m. on the 31st of October two aeroplanes dropped ten bombs, with no effect, on Dover, and six more in the sea. On the evening of the same day, for about two hours from 10.37 p.m., relays of bombing aeroplanes came in from the sea over Essex and Kent. *Map 20* Twenty-two Gothas took part in the attack and we followed their movements with fair accuracy. The objective was London, but the cloudy weather made the task of the bombers a difficult one, while the barrage fire put up by the anti-aircraft guns seems to have been effective, especially in the London area, in turning some of the attackers away. A few who got through to London dropped bombs on riverside buildings south-east of the city. Elsewhere attacks were made on Dover, Herne Bay, and Ramsgate, on camps near Canterbury, and on places scattered throughout Kent. The bombs which fell in the London area (85) killed eight persons and injured fourteen, but caused little damage except at Erith, where house property suffered. One person was killed and six were injured by anti-aircraft shells. Bombs on Kent (183) caused one death and injuries to two people, but the damage was inconsiderable except at Ramsgate, where a gasometer was burnt out and much shop and house property was demolished. Fifty defence pilots ascended in southern England and a few of them had glimpses of some of the raiders: there were two brief indecisive attacks. How far hits were made by the anti-aircraft guns, or by the aeroplane pilots, it is impossible to say, but one Gocha caught fire and was destroyed on landing, and four more crashed and were wrecked, apparently in Belgium. The weather was not again favourable for aeroplane attacks during the remainder of the Hunters' moon, which entered its last quarter on the 6th of November.

In December the conditions were again generally unfavourable, except on three nights when moonlight coincided with fair weather. On the three nights attacks were attempted. The first began in the early hours of the 6th of December and was notable for the great number

Map 21 of incendiary bombs dropped. A total of 395 of these bombs were released as against only twenty-eight of the high explosive type. The objective was London, and the aeroplanes which set out numbered nineteen Gothas and two Giants. Three Gothas turned back with engine trouble, but all the remainder attacked. Six of them reached London, which was bombed fairly continuously between 4.30 a.m. and 5.40 a.m.: a great amount of damage was caused by fires, notably in Finsbury, Kennington, and Whitechapel. The estimated monetary damage in the London area was £92,477, and the casualties due to the bombing were two killed and seven injured. Anti-aircraft shells killed a woman and injured eight persons, and caused damage to 169 houses. Bombing attacks were also made on Sheerness, Purfleet, Margate, Ramsgate, Dover, Whitstable, and Herne Bay. Most damage was done in Sheerness, where twenty-five bombs killed four people, injured twelve, and demolished five houses. The total number of bombs dropped outside London was 147 (128 of them incendiary), but the only casualties, other than those at Sheerness, occurred in Margate, where thirty-one bombs were dropped and one woman was killed and another injured. Thirty-four Royal Flying Corps pilots attempted to intercept the bombers, but there were no encounters. The anti-aircraft gunners, however, had an appreciable success. It was clear that the barrage fire turned some of the raiders away from London and possibly also from objectives outside London. More important still, two Gothas were shot down by gun-fire in England: one landed near Canterbury and the other on the aerodrome at Rochford, and both were destroyed in flames after landing. Another Gotha was almost certainly damaged by gun-fire and was lost, probably in the sea on the way home; two more bombing aeroplanes, similarly damaged, made forced landings in Belgium, and a sixth, for some unexplained reason, crashed on its home aerodrome.

The German crews were disappointed with the visible results of the incendiary bombs. 'A great deal of time', wrote Major Freiherr von Bülow,¹ 'was spent over the

¹ *Die Luftwacht*, June 1927.

'design of these incendiary bombs, on whose effect on the 'densely populated London area such high hopes were 'based. The bomb was a complete failure. During two 'night raids on England, on the 31st of October and the '6th of December, 1917, large numbers of these bombs 'were dropped, both times with no success. The sound 'idea of creating panic and disorder by numbers of fires 'came to nothing owing to the inadequacy of the material 'employed.'

The next December attack, on the 18th, was unexpected *Map 22* because the moon was under five days old and gave little light. The country, however, was under snow and this helped to define some of the salient features, particularly the course of the Thames, which could easily be followed from the air. The attack was made by fifteen Gothas and by one Giant, which reached London after the Gothas and dropped, among others, a 300-kg. bomb, the first of this weight to fall from an enemy aeroplane on England. It exploded in the roadway of Lyall Street, near Eaton Square, and caused damage to the surrounding houses. The other bombs dropped by this aeroplane were forty-three incendiaries, but they inflicted only slight damage: one of them fell in Buckingham Palace Gardens. Before this attack, which was made soon after 9 p.m., six Gothas had dropped high explosive and incendiary bombs on London at various times between 7.10 p.m. and 8.30 p.m. They killed eleven persons and injured sixty-two, and caused damage to property estimated at £318,000. Outside London, Margate was the chief place to suffer. Here, twenty-four bombs demolished a house, injured a woman, and damaged a meeting-house, a school, and 222 houses. Fourteen bombs dropped on places in Essex killed one woman and injured three men, but caused no material damage. Three of the forty-seven Royal Flying Corps pilots who patrolled had encounters, and one of these was successful. Captain G. W. Murlis-Green was attracted by the exhaust flames of a Gotha near Goodmayes, Essex, and as he approached, the German bomber was illuminated by a searchlight. He attacked, but he could only fire short bursts because the flash of his gun temporarily blinded him.

One engine in the Gotha went out of action, but the German pilot persisted on his course and dropped his bombs on Bermondsey ten minutes later. He then made for the coast which he reached at a low height about 8.20 p.m. The second engine then failed and the Gotha fell in the sea near Folkestone: as it was being towed into harbour it was wrecked by an explosion: the German pilot was drowned, but the observer and the machine-gunner were taken prisoners.

Over 10,000 rounds were fired by the anti-aircraft guns. Again they caused casualties (two killed, seventeen injured) and minor damage to 240 buildings, but they appear to have turned some of the bombers away from London. There was good evidence that at least one Gotha was hit by anti-aircraft gun-fire, and it is possible that more were damaged because the casualties among the bombers were high. In addition to the Gotha which fell into the sea at Folkestone, another crashed, two suffered damage through forced landings, two were destroyed by fire when landing on their aerodromes, and two more were damaged.

Warning the Public at Night

The unexpected attack of the 18th of December led to the introduction of sound warnings at night. The raids which began by moonlight in September had resulted in many complaints from the public that the existing procedure of sending constables about the streets with *Take Cover* placards was not sufficiently effective. It worked well in the main thoroughfares, but the warning was sometimes slow in penetrating to the side streets and often failed to reach people indoors. Many householders stated that they had made careful arrangements to move their families, from upper floors especially, to places which offered shelter, and they complained because they were not given the warning which would enable them to do what they could to protect themselves. It was objected officially that imprudent people, startled by sound signals at night, would rush about the streets in search of shelter,

and suffer through falling anti-aircraft gun shells or through bombs. Furthermore, the noise made by exploding maroons was loud and was calculated to disturb people unduly at night, especially those of nervous dispositions or in delicate health. These and other official objections had been embodied in a memorandum on the 26th of October to the War Cabinet which had eventually decided that the existing arrangements for night warnings should not be altered.

The raids at the end of October and at the beginning of December 1917 had renewed the public disquiet, but still the Government refused to sanction sound warnings by night. Then on the 18th of December a difficulty arose. The attack on London had developed so swiftly that the Commissioner of Police had had insufficient time to send out the constables of the metropolis with their *Take Cover* placards. Within eight minutes of receipt of the preliminary warning, *Air Raid Action* had been ordered, and the Commissioner, after consultation with the Home Secretary, had decided that the maroons must be fired as it was impossible to warn the general public effectively in any other way. Once night signals had been employed, the retention of the arrangement, so strong was public opinion on the matter, became inevitable. Even so, the Government did not go all the way to meet public demand. It was first decided that the maroons should be fired, when necessary, up to 11 p.m., but that they must not be used after that hour if the Commissioner of Police believed that he had sufficient time to mobilize the staff required to disseminate the warning in the ordinary way. This decision was made public by a notice issued by the Commissioner on the 10th of January 1918. Local authorities, however, pressed for an extension of the time limit to midnight and, in the middle of February 1918, this extension was approved. The next step came with the approach of summer time, which would put 'midnight' back to 11 p.m. by Greenwich time. On the advice of the Commissioner of Police, the Home Secretary decreed, in the middle of March 1918, that the maroons should be used, henceforth, at any hour.

Observer Posts

From December 1917 the police throughout the country took over many of the observer posts. The arrangement of these posts in cordons has already been explained.¹ They were connected, wherever possible, with the appropriate Warning Control head-quarters by direct line, but some of them employed the telephones of specified private subscribers which were reserved for military use at those times when the observer posts were occupied. The code word *Airbandit* ensured a clear line for any message to and from the Warning Control. Under the original scheme the posts were manned by military personnel, unfit for active service, who were organized in fourteen companies as part of the Royal Defence Corps. The arrangement, however, had not proved satisfactory. Much depended on the reports made by these military observers who, although they spent a great part of their time in idleness, had to exercise quick and cool intelligence when raids were in progress. As the only reason they found themselves in the observer posts was because they were physically unfit for more strenuous service, it is not surprising that many of them failed to reveal the qualities desirable in an observer. In December 1917, therefore, General Head-quarters, Home Forces, suggested that, except on the East Coast and in that part of the south-eastern counties liable to sudden aeroplane attack, the military observer posts should be replaced by police posts. In the excepted areas continuous observation was essential, but elsewhere it would suffice if the posts could be manned by the police when the preliminary warning of enemy air activity was issued. The suggestion was approved, and the police gradually took over the majority of the observer posts and thus relieved twelve of the fourteen military companies. The two observer companies Royal Defence Corps retained were No. 15 for England, and No. 16 for Scotland. A coastal cordon had also been established, when the war ended, from Peterhead in the north to Swanage

¹ Vol. III, pp. 172-3.

in the south, manned by naval personnel and by coast-watching troops.

The final aeroplane attack of 1917 was made by one Gotha and two Giants and seems to have been directed against coastal towns in Kent. At 5.45 p.m. on the 22nd of December the Gotha passed over Westgate and, fifteen minutes later, landed in a field at Margate, where the crew set fire to their aeroplane and surrendered to the police. They explained that one of the Gotha's engines had gone out of action and that the aeroplane had consequently become almost unmanageable in the gusty wind: the bombs had been dropped in the sea to lighten the craft. The two Giant type aeroplanes carried a total number of bombs weighing 2,000 kg., but none of these fell on land: some of them were heard exploding in the sea between Ramsgate and Sandwich. None of the eighteen Royal Flying Corps pilots who patrolled saw anything of the enemy.

1918

The Air Council had been formed on the 3rd of January 1918, with Lord Rothermere as Secretary of State and President, and although Lord French, as Commander-in-Chief of the Home Forces, remained entirely responsible for home defence, the existence of an Air Council meant that the collective judgement of all those directing air affairs could be put forward authoritatively.

At a meeting of the War Cabinet held on the 11th of January, a memorandum by the Secretary of State for War was considered upon the subject of resolutions received from the inhabitants of Sheerness. These had been passed at a mass meeting organized by the trade union movement, and they included a protest 'against the continued refusal of the military authorities to provide suitable bomb-proof shelter and a greater measure of protection against enemy action; also against the complete absence of warning at night of the approach of hostile aircraft'. It was also stated 'that any further delay in dealing with these matters would be an outrage upon the

'inhabitants and may prove disastrous'. Other resolutions had reference to compensation for air-raid victims. The questions raised had often been brought forward before, and the attitude of the Government had been defined, namely, that the provision of air-raid shelters was a matter for local authorities but that, in general, it was undesirable to encourage people to leave their homes to take shelter elsewhere. A house offered a good protection against bomb splinters, and the risk of heavy casualties was not so great when people remained at home as when they were crowded in shelters which could not be made proof against a direct hit.

The points raised, however, by the Sheerness resolutions prompted the War Cabinet to discuss the possibility of large-scale attacks on London. There was talk of 500 bombing aeroplanes, and of fires being started on a scale with which the Fire Brigade would be unable to cope. Some divergence of view about the number of German bombers available was disclosed, but the balance of expert opinion was that really big attacks were unlikely. In the result the War Cabinet decided to call for a detailed report from Lord French on the air defences of London. In his report,¹ which was ready on the 17th of January 1918, Lord French, reviewing the scheme of defence against airships, said: 'The Zeppelin menace cannot be said to have disappeared. Great improvements have been made 'in the speed, radius of action, and climbing power of the 'latest type of Zeppelins, while their visibility has been 'reduced by camouflaging the underparts of the envelope 'with black dope. The return of warm weather will 'probably be the signal for renewed Zeppelin raids, but 'in view of the recent increases in the defences of London 'and the south-east of England it is probable that they will 'direct their attacks on the north-east coast or Midlands.'

Lord French then proceeded to deal with the question of countering the daylight aeroplane raids, and he showed how the reorganization of the gun and aeroplane defences, together with the re-equipment of the defence squad-

¹ The map, accompanying the report, which set out the scheme of defence for London and south-east England, faces p. 1.

rons with first-class fighting aircraft, had caused the enemy to give up these raids in favour of night attacks. The difficulties in the way of efficient defence at night, he pointed out, were many. Only expert pilots could fly the unstable single-seater fighters in the dark. New type fighting aeroplanes had been evolved and fifty had been delivered to the eight squadrons in the south-east of England, but it would take time for the pilots to become proficient in night-fighting. The need to provide anti-aircraft gun protection for widely dispersed vulnerable points in London and the south-eastern areas made it difficult to arrange an adequate zone for the operation of the large number of Royal Flying Corps squadrons disposed between London and the East Coast. The anti-aircraft scheme of fire was based chiefly on sound and it was, of course, impossible, when firing at sound, to distinguish friend from foe. Lord French recognized that, to increase the areas reserved for aeroplane operations, modifications in the disposition of the fixed guns would probably be necessary, but it was, he stated, 'at present difficult to determine the ultimate relative value of guns and aeroplanes as weapons of defence, and to what extent such modifications will be justified'. He proceeded to lay stress on the importance of the searchlight. The small 60-cm. searchlights supplied for home defence had been effective against the old-type airships, but had proved to be useless against the latest type Zeppelins and against the high-flying aeroplanes. A few 150-cm. lights had been obtained from a French firm, and it was expected that deliveries of a considerable number of British-made 120-cm. searchlights would begin in the near future. A new type of carbon which would greatly increase the range of the lights was also being manufactured, and sound locators which would enable the lights to be trained on an audible, but invisible, target were being distributed, as were parachute flares to be fired from the anti-aircraft guns. 'These improvements', he said, 'will, it is hoped, have the effect of turning the scale in favour of the illumination of the target. It remains to be seen whether the guns or the aeroplanes will derive the greatest advantage.' Lord

French emphasized the need for a longer range anti-aircraft gun firing a heavier shell than those in use. Referring to the balloon aprons he said that three were in operation and that it was hoped to complete the remainder, up to the authorized total of twenty, at the rate of four each month. The aprons could ascend to a height of 8,000 feet, but the provision of larger-type Caquot balloons would enable them to be raised to 10,000 feet. Their main effect was a moral one, but they tended to keep enemy pilots at heights which made it impossible for them to drop bombs with accuracy of aim. In addition to these various measures, three hundred Lewis guns had been installed at vulnerable points to keep enemy aircraft from descending below heights at which anti-aircraft gun-fire ceased to be effective, and arrangements had been made to equip with high-angle mountings the machine-guns with the Home Defence Garrison and with Field Army troops. Finally, to help to establish the height and movements of enemy aircraft, wireless-fitted aeroplanes patrolled given areas: the observers signalled their information to receiving stations which were in direct telephonic communication with the area head-quarters.

When Lord French's report was received by the War Office, it was considered necessary, before the adequacy or otherwise of the existing defences could be assessed, to arrive at an agreed estimate about the number of German bombers which might be made available for raids against England. The matter was therefore referred to the Chief of the Air Staff and it was ultimately agreed that, looking ahead to the early summer of 1918, 118 bombers was the maximum number which need be allowed for, and of these it could be reckoned that no more than eighty would at any one time reach this country. Lord French was informed of this estimate and he was asked to say what additional strength, if any, he would require to ensure the defeat of an attack by eighty aeroplanes. He thereupon set out his total requirements as follows: 349 anti-aircraft guns; 623 searchlights; and 264 aeroplanes. These figures represented an addition of 300 searchlights which, it was stated, should be of the 120-cm.

type; of 100 guns, which should be of more than 3-inch calibre; and of 40 aeroplanes.

Lord French's reports, with a covering memorandum by Sir Henry Wilson, who had succeeded Sir William Robertson as Chief of the Imperial General Staff a few days before,¹ were considered by the War Cabinet on the 27th of February. Sir Henry Wilson, in his memorandum, recommended that, in view of the importance of maintaining the morale of the capital of the Empire, home defence requirements for anti-aircraft guns should be given precedence over the demands of the British Expeditionary Force.² On the other hand, because of the great importance of superiority in the air in the battle which it was anticipated would begin before long on the Western front, the Royal Flying Corps in France should continue to have precedence over home defence for aeroplanes. These recommendations received the approval of the War Cabinet.

It is of interest, as reflecting the serious view taken of the night aeroplane attacks, that the Air Council, at their meeting on the 22nd of January 1918, decided to construct underground hangars at home. Major-General Trenchard pointed out, during the discussion, that it was undesirable to do this in France because the squadrons on the Western front had to be kept mobile, but that this objection did not apply at home. A beginning was therefore made at Manston where the air station was, at the time, being expanded: the construction of five underground hangars was approved, but after work on them had been in progress some time it was decided that two only should be completed.

Night raiding began again on the 28th of January 1918, *Map 23* when bombing aircraft came in at intervals between 7.55

¹ On the 20th of May 1918 Lieutenant-General Sir William Robertson succeeded Lord French as Commander-in-chief, Home Forces, in consequence of the appointment of Lord French as Viceroy of Ireland.

² Sir Douglas Haig was, at this time, pressing for additional anti-aircraft guns for the defence of the aerodromes of the bombing squadrons in the neighbourhood of Nancy.

p.m. and 10.25 p.m. The sky was overcast and there was ground mist in England as there was also in Belgium, and some of the Gothas which had been ordered to attack could not leave their aerodromes. In the end thirteen Gothas and one Giant set out, but six of the Gotha pilots turned back because of the mist and poor visibility generally. It seemed at the time that about nine aeroplanes reached and attacked London, but the reports of the German crews show that the capital was bombed by three Gothas and by one Giant. The remaining four Gothas attacked Ramsgate, Margate, Richborough, and Sheerness. Houses were damaged at Ramsgate and also at Sheerness, where two men were killed and five injured, but otherwise there was little damage outside London. All the bombs which fell on the capital were of the high-explosive type and at least forty-four were traced, notably in the eastern districts, in the City, Holborn, Vauxhall, Hampstead, and in Long Acre. A great number of houses were destroyed (monetary damage £173,000), and the casualties were high, 51 persons being killed and 136 injured as a result of the bombing. In addition, people who mistook the warning maroons for bombs rushed in panic to the air-raid shelters at Bishopsgate Goods Station and at Mile End railway station, and in the stampede fourteen of them were killed and fourteen injured, mostly women and children. Finally, anti-aircraft shells caused injury to eleven people and damage to 311 houses.

It is of interest that bombs fell close to three Thames bridges. One exploded on the river-bank near Vauxhall Bridge, another burst on a barge moored alongside London Bridge, and a third fell in the river near the centre of Waterloo Bridge. This last-named bomb exploded close enough to damage lamps on the bridge itself, and it is possible that some damage was also done to the foundations of the bridge.¹

The majority of the casualties in London were caused by the bombs which came from the Giant. According to

¹ Expert opinion seems to be against the view that there was any connexion between this bomb and the sudden subsidence years afterwards which led to the demolition of the old Waterloo Bridge.

German information this aeroplane carried bombs to a total weight of 1,200 kg., two of them of the 300-kg. type. One bomb from the Giant exploded in Messrs. Odhams's Printing Works in Long Acre which were being used as an air-raid shelter. It was presumed that this bomb was of 50-kg. weight, but as no 300-kg. bombs were traced, it is almost certain that it was a bomb of the heavier weight which caused the devastation at Messrs. Odhams's premises. The crew of the Giant make reference in their report to a big fire which broke out after one of the 300-kg. bombs had been dropped, and although they thought they were at the time 'close to the Admiralty', there seems little doubt that the fire they saw came from Long Acre. That the bomb inflicted such heavy damage was largely a matter of chance. The building was a substantial one with three concrete floors, up to nine inches in thickness, between the roof and the basement where the people were sheltering. Where bombs had previously made hits on buildings of similar construction the damage had been confined to the upper floors. Messrs. Odhams's building, however, was not directly hit. Unhappily the bomb crashed through a pavement light alongside the building, and the whole force of the explosion was directed into the basement. The lower part of the main walls and the adjacent supporting piers of the building were shattered, with the result that the immediate super-structure caved in and pulled out the upper floors. The outbreak of fire which followed added to the agony of those imprisoned in the debris: thirty-eight of them were killed and eighty-five were injured or burnt.

On its inward journey to London, the Giant had encountered two of the patrolling pilots of the Royal Flying Corps. One of them attacked and caused the German pilot to alter course. For a time the Giant was lost in the darkness, but it was found near North Weald by Second Lieutenant J. G. Goodyear of No. 39 Squadron. This officer pursued and attacked the bomber and the ensuing fight, though brief, was intense. A hit in the engine put the British aeroplane out of action and another bullet wounded the Royal Flying Corps observer. Having met and overcome

this challenge, the pilot of the Giant pursued his course direct to London, but, near Chingford, he flew into a balloon apron. The German aeroplane presumably took the obstacle in its flight, and, by some chance, escaped damage. The apron itself suffered considerably and it seemed that parts of two apron streamers were carried away by the Giant.¹ Fortune assuredly favoured the German crew because another pilot, who found and pursued the enemy bomber on its outward journey, was unable to get his gun to work when he had placed himself in a favourable position for attack.

The Royal Flying Corps, however, did not go entirely unrewarded. The bombing of Hampstead was done by a Gotha which was discovered as it was leaving London again by two patrolling pilots who engaged it steadily and eventually brought it down in flames at Wickford: the German crew of three were killed.

Nearly 15,000 rounds of ammunition were fired by the anti-aircraft guns, most of them in a new pattern of barrage fire known as the *polygon*, which aimed at the consecutive encirclement of the bomber by an irregular screen of bursts. There is evidence that some of the German bombers were induced to alter course on the 28th as a result of the polygon barrage, and it seems clear that at least one of them was turned away from Woolwich Arsenal. There is, however, no record that any of the bombers was hit by the anti-aircraft guns and, except the one shot down by aircraft at Wickford, all the bombers returned to their aerodromes, where four were damaged on landing.

Map 24 No Gothas took part in the next attack, made on the night of the 29th/30th of January. We knew at the time that three Giants came overland, but thought that they were also accompanied by a few smaller type aeroplanes; it is now clear, however, that British aircraft were mistaken

¹ A member of a Gotha crew, taken prisoner during a subsequent raid on the 19th/20th of May, gave the information that a Giant aeroplane, presumably the one here referred to, hit a balloon cable and, as a result, one plane was damaged. The Giant fell some hundreds of feet before the pilot was able to regain control.

for those of the enemy. Actually four Giants started, each loaded with a total of 1,000 kg. of bombs, but one had engine trouble and turned back soon after leaving its aerodrome. Two of the others reached the London area, but the third was turned away from the capital by the barrage fire at Billericay and dropped its bombs on Rawreth, Thundersley, and Rayleigh, and in the sea off the Blackwater and off Margate: three houses at Rayleigh and a farm building at Rawreth were damaged.

One of the two Giants which approached London was attacked at 12,000 feet by a B.E.12 pilot of No. 37 Squadron. The British aeroplane received many hits and, so far as could be judged, the Giant was also hit, but whether this was so or not it is certain that the bomber turned off to the west and dropped its bombs hurriedly. They fell mainly on Isleworth, Kew, and Brentford, and damaged houses and killed ten persons and injured ten more. On its homeward flight this Giant was attacked near Gravesend by a pilot who put a burst of 100 rounds into it before he had to break off the fight through being temporarily blinded by the flash produced when one of his tracer bullets struck the propeller of his aeroplane.

The second Giant which attempted to attack London was frustrated by patrolling pilots. It was discovered near North Benfleet, Essex, as it came in, and was pursued and attacked by four pilots with such effect that the full load of bombs was dropped near Wanstead, where they exploded harmlessly. The Giant, still under attack, turned back immediately, but although pursued and intermittently fired at throughout its journey to the coast near Eastchurch, suffered no visible damage and disappeared in the darkness over the sea.

The next moonlight raid was made on the 16th of *Map 25* February by five Giants which carried a total of 4,250 kg. of bombs, among them one weighing 1,000 kg., the first of its kind to be dropped on England. Two of the five bombers reached London. One dropped the 1,000-kg. bomb on the north-east end of the Chelsea Hospital built by Sir Christopher Wren. An officer of the hospital staff was killed with his wife, her sister, and two children: three

other children were taken alive from the debris. Many neighbouring buildings, including the Chelsea Barracks, were damaged. The second Giant attacked Woolwich and Beckenham with two 300-kg. and eight 50-kg. bombs. Those which fell on Beckenham exploded in allotments and in a park and caused neither damage nor casualties, but the bombs on Woolwich killed seven persons, injured two, and damaged several buildings, among them the Garrison Church.

The only bombs dropped outside London fell harmlessly near St. Margaret's Bay, east of Dover. The Giant responsible for this attack had trouble and, with three of its engines out of action, only just succeeded in reaching the Belgian Coast. We traced no bombs from the remaining two aeroplanes and, although we knew they were near the coast, we could not discover that they came inland.

Map 26 An attack next night, February the 17th, was made on London by one Giant. From reports at the time it appeared that many German aeroplanes took part in the raid, but Royal Flying Corps aeroplanes were again widely reported as hostile and some of them suffered attack by the anti-aircraft guns. The noise made by the engines of the Giant also contributed to the confusion. For instance, as the bomber approached the Nore about 10 p.m. on the 17th it was heard quite plainly at Southminster, some thirteen miles to the north, and was naturally reported as another aeroplane coming in near Southminster. The Giant entered London from the south-east and dropped nineteen 50-kg. bombs between Lee and St. Pancras railway station. Most damage was inflicted by the bombs which fell last, a group of six aimed at the station. People who were sheltering from the attack under a railway arch found themselves in the centre of the explosions, and twenty persons were killed and twenty-two injured. Damage was done to the booking offices, to stores, and to the Midland Grand Hotel. Before the bombs fell at St. Pancras, casualties and damage had been inflicted in Lewisham, Peckham, and Southwark, the total casualties for the raid being twenty-one killed and thirty-two injured, while the damage was estimated at nearly £40,000. Sixty-nine pilots, twenty-two

of them in Sopwith 'Camels', patrolled, but only one of them came in contact with the bomber which, however, was lost to view when the British pilot was blinded by the flash from his gun after he had fired fifty rounds.¹

The next night, the 18th/19th of February, was something of a mystery night. There were all the elements of an attack on London except that there were no enemy aircraft. Calais was bombed about 9.50 p.m. on the 18th and it is possible that one or more aeroplanes came within hearing of the Kent Coast. However that may be, warnings were distributed in southern England, and fifty-five pilots ascended on patrol. The Royal Flying Corps aeroplanes were soon being reported as German and fire was opened on many of them. In all, about 4,000 rounds were fired by the anti-aircraft guns, mostly in the London area. These alarms and excursions reveal how sensitive the nerves of the public, and of some of those responsible for the protection of the public, had become.

There was quiet until the night of the 7th of March *Map 27* which was moonless, but was made light by an aurora borealis. Six Giants started, but one of them turned back because of engine trouble before it reached the English coast. Three of the remainder reached London and one got as far as Luton, but the fifth did not progress beyond Billericay in Essex. One of the seventeen bombs which fell on London weighed 1,000 kg. and hit No. 67 Warrington Crescent, Paddington. It wrecked much of the street and killed twelve persons and injured twenty-three. Twenty-three houses were demolished, or very seriously damaged, and 400 more suffered damage of some kind. The other bombs also inflicted considerable damage, mainly in St. John's Wood, Whetstone, Hampstead, and Battersea, in which places nine more people were killed and fifteen injured. The bombs outside London fell chiefly in fields, but one which exploded in Herne Bay damaged an hotel and a few houses. Owing to the absence of a moon, the raiders seem to have had difficulty in

¹ It was about this time that an anti-flash device was fitted to the muzzles of the machine-guns: the proportion of tracer bullets was reduced. See p. 150.

finding their way, nor did any of the forty-two Royal Flying Corps pilots who patrolled see anything of them. The bombers were occasionally caught in the beam of a searchlight and they were compelled, from time to time, to alter course on account of the anti-aircraft barrage fire: although there was no evidence that any hits were made by the gunners, two of the Giants, for some unknown reason, made forced landings on their return and were badly damaged.

Zeppelin Disasters

Within a week there was a return of the Zeppelins. After the attack on the 19th/20th of October 1917, when the German naval airship service had suffered so heavily, Zeppelins had kept away from England. It is unlikely that the Germans would have allowed so much time to elapse before resuming the attacks had it not been that the naval airship service had received a second crippling blow. In the afternoon of Saturday, January the 5th, 1918, there were, in the sheds at the main base at Ahlhorn, the Zeppelins *L.46*, *L.47*, *L.51*, and *L.58*, and the Schütte-Lanz *SL.20*. Two cleaners were at work in the after car in the *L.51* and six civilian employees were making repairs to the Schütte-Lanz, but, except these few workmen and the guard, the sheds were empty. Most of the airship and ground personnel, numbering about 1,000, were in the adjacent barracks. Suddenly there occurred a series of explosions, accompanied by leaping flames from the sheds. The cause of the disaster is a mystery, but it seems clear that it began in the double shed housing the *L.47* and *L.51*. The two cleaners in the latter ship, who escaped with burns, testified that a fire followed a dull report in front of the car in which they were working. The flames spread rapidly, and within a minute the five airships and three of the four sheds which contained them had been destroyed. The remaining three sheds had been damaged more or less considerably and some of the men's quarters had been demolished. Fifteen men were killed, thirty seriously injured, and 104 slightly injured. It was believed for a time that the disaster had

been caused by a British air attack, and when this possibility was ruled out it was freely rumoured that the destruction of the base was an act of sabotage, a suspicion which gained ground because it was known that there was considerable disaffection among the station personnel. The expert finding was that the disaster had been due to an accident, and the suggestion was put forward that a piece of roofing, made loose by the winter storms, had fallen and damaged a fuel tank, and that the fire was possibly started by sparks thrown off from bracing wires as they were struck by the falling piece of roof. Some authorities in Germany have never accepted this explanation and believe that the destruction resulted from an act of treason, for which, however, there seems to be no supporting evidence.

There is little doubt that this loss of four up-to-date Zeppelins, together with the latest Schütte-Lanz, put an end for a time to the German airship raiding campaign. The German naval command had prepared plans for a series of attacks on England in which Zeppelins were to be supported by the German fleet, and were to operate in close co-ordination with the military bombing squadrons stationed in Belgium. Whether, in any circumstances, the plans would, or could, have been put into effect is open to debate, but after the Ahlhorn disaster they were not further considered.

On the 10th of March 1918 a new ship, the *L.63*, was Map 7 commissioned and, two days later, she set out for the midlands of England with four others, the *L.53*, *L.54*, *L.61*, and *L.62*, the whole under the personal command of Fregattenkapitän Strasser. The *L.54* (Kapitänleutnant Buttlar) did not come overland, but dropped her bombs among Grimsby trawlers in the North Sea, some of which, equipped with anti-aircraft guns, opened fire on the Zeppelin.¹ The *L.53* (Korvettenkapitän Prölss) reached the Yorkshire Coast before 10 p.m., but did not cross and

¹ Buttlar thought he attacked Grimsby itself. He reported heavy anti-aircraft gun-fire, and at least one shell exploded near the airship which had a cell badly holed. Buttlar had to throw out water ballast and petrol to lighten the ship.

soon went home again,¹ and although the *L.61* (Kapitänleutnant Ehrlich) passed over a part of Yorkshire we could not discover that she dropped any bombs.² The damage, such as it was, was done by the *L.62* and *L.63*.

The former ship, commanded by Hauptmann Manger, seemed to us at the time to make a good attempt to reach and attack the naval airship sheds at Howden, but her bombs (twenty-seven) were eventually dropped in fields six miles north of Howden: an inn and some cottages were damaged.³ The newest ship, the *L.63* (Kapitänleutnant von Freudenreich), came in at Hornsea at 8.30 p.m. and followed the railway directly into Hull, where bombs began to fall about 9 p.m. Six exploded within the municipal area of the city and sixteen more fell in fields at Sutton and Swine. A few houses were damaged in Hull, where one woman died of shock, but otherwise the bombs exploded ineffectively.⁴

The failure of the raid was due chiefly to the weather conditions which were entirely unfavourable. The clouds were low and there was some rain, and as the airships were navigated at heights between 16,000 and 20,000 feet it was impossible that targets could be selected. The searchlights could not pierce the clouds, and most of the anti-aircraft gun-fire was directed according to the sound made by the engines of the Zeppelins. Apart from the bad weather conditions overhead, there was much ground mist and no more than ten pilots were able to get into the air: they saw nothing. While the airships were attacking Yorkshire, enemy aeroplanes were heard off the Kentish Coast and there was some expectation, for a time, that southern England would also be attacked, but the German bombers raided Boulogne.

Map 7 Zeppelins were out again on the 13th. They were the *L.42*, *L.52*, and *L.56*, but when they were on their way

¹ Prölss thought he attacked Hull with 3,000 kg. of bombs. They fell, presumably, in the sea.

² Ehrlich reported that he attacked anti-aircraft batteries. He flew over sparsely inhabited country and his bombs, perhaps, fell on waste land.

³ Manger thought he attacked Leeds and Bradford.

⁴ Freudenreich knew he was over a big city, but thought he was farther west, at Leeds.

reports of strong northerly winds led to their recall by wireless. Two of them, the *L.52* and *L.56*, turned back, but the commander of the *L.42* decided to continue, in spite of the order, because the opportunity seemed promising. This ship, commanded by Kapitänleutnant Dietrich, passed near warships about 110 miles east of Whitby, but continued on her course and came in over Hartlepool, unheard, at 9.15 p.m. We had followed the movements of the three airships across the North Sea with some difficulty, and because of uncertainty no warning had been given to the north-east coast towns. In consequence the industrial works in the area were showing lights and, although the *L.42* was flying at 18,000 feet, her commander was able to pick out objectives for his bombs, most of which were aimed at the docks. Twenty-one bombs fell on West Hartlepool and destroyed or damaged shops and houses, and killed eight persons and injured thirty-nine. As the *L.42* moved swiftly south from West Hartlepool she was seen by Second Lieutenant E. C. Morris (observer, Second Lieutenant R. D. Linford) of No. 36 Squadron who was patrolling at 14,500 feet in an F.E.2d. The Zeppelin, her bombs gone, had now climbed to 20,000 feet and the British pilot went up after her as high as he could. At 17,300 feet he had reached his 'ceiling', but he followed the *L.42* for forty miles out to sea in the hope, which proved vain, that she might lose enough height to enable him to attack.¹ Two of the Royal Flying Corps defence aeroplanes crashed on landing and one pilot was killed.

For a month there were no attacks from the air, but when the next raid was made, again by Zeppelins, on the 12th/13th of April, it looked as though the German naval airship service had once more become a serious menace. Bombs exploded as far west as Wigan in Lancashire, and in the manufacturing districts of Birmingham, and the

¹ Dietrich knew he attacked Hartlepool, and his report says the town was taken by surprise and that none of the lights was extinguished until half his bombs had been dropped. The attack is fully described by Korvettenkapitän a.D. Dietrich-Bielefeld in an article in the *Marine-Luftflotten-Rundschau* for June 1927.

two Zeppelins which took part each dropped about two and a half tons of bombs, a greater load than we had hitherto traced from any one raiding airship.¹ Furthermore, it was again emphasized that the power of the Zeppelins to fly at heights up to 20,000 feet made them almost immune from gun or aeroplane attack.

Map 8 Five airships set out, namely, the *L.60*, *L.61*, *L.62*, *L.63*, and *L.64*, with Fregattenkapitän Strasser in command. The *L.60* (Kapitänleutnant Flemming), which came in south of Spurn Head, was overland only about an hour, and her commander judged that he had reached Leeds, but his attack was made south of the Humber, where 34 bombs fell, mainly at East Halton and Thornton Saxby, without inflicting damage.² The *L.64* (Korvettenkapitän Schütze) approached Lincoln, but did not attack the city which was in darkness and therefore probably escaped notice. At Skellingthorpe and Doddington, however, lights were showing because the Lincoln buzzer, from which these places received warning of air raids, had not been heard. The lights attracted fourteen bombs which damaged an engine shed and the railway track at Skellingthorpe, but inflicted no damage beyond breaking glass at Doddington. Four more bombs came from the *L.64* at Waddington and Mere, south of Lincoln, without effect.

The *L.63* (Kapitänleutnant Freudenreich) also approached Lincoln, from the south-east, but the Brauncewell gun came into action against her and seems to have attracted a number of bombs, some of them heavy ones (300 kg.), but they fell in fields east of Metheringham, after which the *L.63* moved off rapidly southwards, dropping six more bombs ineffectively at Fleet and Little Sutton before she went out over the Wash.³

The airship which reached Wigan was the *L.61* (Kapi-

¹ The loads carried by the Zeppelins varied, but some of them, at this time, set out with 3,000 kg. of bombs.

² The *L.60* carried 3,000 kg. weight of high explosive and attacked from 5,200 metres.

³ The log of the *L.63* shows that the anti-aircraft gun-fire reached a height of 5,000 metres. The bombs were aimed at batteries and searchlights, but owing to clouds the effect could not be observed from the airship. It was thought the attack was made near Grimsby.

tänleutnant Ehrlich). She crossed the coast at Withernsea at 9.30 p.m. and went out again a little south of her entry point at 2.35 a.m. On her inward journey the Zeppelin moved towards Sheffield, but passed well south of the town and for some time subsequently appeared to be making for Liverpool. Near Runcorn, however, she turned north and, after dropping two bombs on Bold, began to attack Wigan about 11.30 p.m. No air-raid warning had been communicated to the town and the blast furnaces of the Wigan Coal and Iron Company were in full blaze. There is not much doubt that it was the lights which singled Wigan out for attack. Eight bombs fell on Ince, on the outskirts of the town, and they caused injury to a man and considerable damage to cottage property and to the railway. Then came fifteen bombs on Wigan itself which killed seven persons, injured twelve, and damaged much property. The *L.61* moved on to Aspull, where four 300-kg. bombs fell in a field, but they damaged cottages by concussion, caused injury to four persons, and were indirectly responsible for a fire in a brewery. Two more bombs fell harmlessly at Little Hulton and Radcliffe.

Ehrlich's flight was a bold one, more especially because his report reveals that he had engine trouble on his way in. He journeyed farther west, however, than he realized and it may be said that had he known where he was Wigan would have been safe from attack. The port of Liverpool, with its great docks, was an objective of first-class military importance, and every airship commander looked forward to the night when the conditions would be favourable for an attack on the city. Ehrlich turned northwards to Wigan when he had come almost to the outskirts of Liverpool, and the sole reason was that, according to his plottings, he was near Sheffield. He dropped his bombs on the lights of Wigan in the conviction that he was attacking Sheffield factories.

The Birmingham district was visited by the *L.62* (Hauptmann Manger) which was overland for six hours. She came in across Norfolk at 9.30 p.m., dropped two bombs near a searchlight as she approached Wisbech, and eight more east of the aerodrome at Tydd St. Mary. A

pilot who was patrolling the area climbed after the airship, which he described as 'sitting' over the aerodrome at 18,000 feet while she dropped her bombs, but she soon eluded him, and, after circling near Wisbech again, steered a course for Coventry. As she approached the city she was fired on, and she dropped thirteen bombs which exploded in the open south-east of Coventry. The *L.62* then moved on towards Birmingham, and six bombs came from her between Packwood and Monkspath. As she bore down on Birmingham from the south, anti-aircraft guns opened against her and she then turned and dropped her remaining bombs, two 300-kg., on Hallgreen and Shirley. Again the damage was negligible and there were no casualties. The *L.62*, which had come within striking distance of Coventry and Birmingham and of the congested industrial area in between, had dropped 2½ tons of bombs with no effect, and we were, it must be admitted, fortunate to escape so lightly.¹ As the *L.62* moved eastwards again, Lieutenant C. H. Noble-Campbell of No. 38 Squadron, who was patrolling the line Peterborough-Coventry, sighted her at about 12.15 a.m., and he followed her for about an hour as she made for home. He had a brief machine-gun duel with the ship and, as a result, he received a wound in the head and damage to his aeroplane, so that he had to make a forced landing at Coventry. The airship crew were again aware, as they passed over Norfolk, that aeroplanes were searching for them, but the ship eventually passed out to sea south of Yarmouth without any further encounters.

The weather conditions throughout the areas affected by the raid were unfavourable for flying and many of the defence aeroplanes could not ascend. No more than twenty pilots were able to get into the air, but although a few of them sighted the Zeppelins, the pilot of No. 38 Squadron, already referred to, was the only one to get near enough to attack.

There was a scare, of interest because of its origin, on

¹ The log of the *L.62* shows that she carried four 300-kg., fourteen 100-kg., and twenty incendiary bombs. Of this load we traced twenty-seven bombs.

the night of the 26th of April. A Felixstowe flying-boat, returning from reconnaissance, lost its way and was heard about 11 p.m. near the North Foreland. Anti-aircraft gun-fire was opened, and as the flying-boat moved hesitatingly up the coast towards its base, many reports were made which seemed to show that several enemy aircraft were off the Essex coast. Defence aeroplanes were ordered into the air and soon some of these were reported as hostile until, ultimately, air-raid warnings had been issued over a wide area and work had come to a standstill in all munition factories in Kent, Essex, and in the London district. A conference was held to discuss ways of avoiding incidents of this kind, and various new instructions were issued to the aircraft and anti-aircraft defences. The episode suggests that the Germans missed opportunities. Except for actual damage caused by bombs, the results of a scare of this kind were not very different from those of a large-scale raid, and it seems obvious that guerrilla air warfare as opposed to, or in conjunction with, bombing raids in strength, must have made the task of the defence difficult and would have increased the moral effect of the air-raid campaign.

The Final Aeroplane Attack

Before the next attack, which was the biggest and last of its kind, the defences in the London area had again been reorganized. With the object of enlarging the aeroplane patrol zone, guns were cleared from the north and east of the inner defences and used to strengthen the gun barrier line. The searchlights on the north-east and south-east of the inner defences became 'Aeroplane Lights', whose task was to illuminate the bombers in the aeroplane patrol zone. These lights were organized as four Aeroplane Searchlight Companies, R.E., under an independent commander, but so far as tactical training and operations were concerned, they were placed under the appropriate Royal Air Force squadron commander.

The last of the aeroplane raids took place on the *Map 28* 19th/20th of May. In the light of the moon, from 10.42 p.m. on the 19th of May until about 1.30 a.m. on the 20th,

there was an almost continuous coming and going of aeroplanes over Kent and Essex. As the progress of the raiding aircraft was plotted, the paths which they made crossed and recrossed until they seemed to fill most of a triangle with one point at London and the others at Hythe in the south and at the Naze in the north. With eighty-four aeroplanes from the defence squadrons also in the air, it was extremely difficult to follow the movements of the bombers, but so far as we could make out about thirty-four of them crossed the coast at various times, and of this number apparently thirteen reached London. According to German records, forty-three bombing aircraft started and at least nineteen of them got to London. Seven never returned to Belgium and the German authorities presumed that some of these also reached and possibly bombed London before they were brought down. The forty-three were made up of thirty-eight Gothas, three Giants, and two smaller-type bombers ('C'), and they carried a total of 14,550-kg. weight of high-explosive bombs. It is known that their objectives were Dover and London, and that they left their aerodromes at intervals of about five minutes and attacked independently of one another.

So far as we could trace, seventy-two bombs fell on London. They killed forty-eight persons, caused injury to 165, and destroyed or damaged over 1,000 houses and business premises. Outside London, thirty-six bombs were dropped on various places in Essex and forty-nine in Kent, but most of them exploded ineffectively: three persons were injured at Faversham, and one at Dover, where some damage was also done to property. In addition, anti-aircraft shells killed one person and injured eight more and damaged a few hundred houses. The total monetary value of the damage caused in London was estimated at £130,733.

The outstanding feature of the raid was the success achieved by the anti-aircraft defences—aeroplane and gun. Over 30,000 shells were fired, and although most of the fire was of the barrage-kind, by sound, and often wild, it is clear that some of it was close and imposing enough

to keep many of the attackers away from London. Furthermore the gunners also destroyed three of the raiders. One, which had bombed Sydenham and Catford, was shot down in flames by gun-fire north-east of Foreness on its way out and fell in the sea. Another, which came in over the Essex coast near Wakering, turned back when it was engaged by anti-aircraft guns, but was directly hit and fell in the sea in flames without having dropped any bombs. The third was one of a number which attacked the Folkestone and Dover districts. It was hit before it could drop its bombs and fell in flames near Dover. The wreckage of this aeroplane was found on the water next morning and the body of one of the crew was recovered by a trawler.

The defence pilots were equally successful. Nearly every one of the eighty-four aeroplanes which went up on patrol was capable of overtaking the raiders. Chiefly they were Sopwith 'Camels', S.E.5a's, and Bristol Fighters,¹ all first-class fighting aircraft of their time. There were many enemy bombers about and the British pilots had, by this time, had opportunity to get accustomed to night-flying conditions so that there were many encounters.

One Gotha, after dropping bombs on Rotherhithe, off the Old Kent Road, and in Peckham, was found near Maidstone by Major F. Sowrey of No. 143 Squadron who fired two double drums of ammunition into it from underneath and wounded the pilot. The Gotha, however, escaped into the darkness, but had not gone far when it was attacked by a Bristol Fighter of No. 141 Squadron (pilot, Lieutenant E. E. Turner; gunner, Air Mechanic H. B. Barwise) and, further damaged, made an attempt to land at the Harrietsham aerodrome: it crashed and only one of the crew of three survived.

Captain C. J. Q. Brand, in a Sopwith 'Camel' of No. 112 Squadron, met an incoming Gotha over Faversham at 8,700 feet, and with his first burst of fire put one of the bomber's engines out of action. The Gotha turned sharply, nose down, but was followed by the 'Camel'

¹ 31 'Camels', 28 S.E.5a's, 14 Bristol Fighters, 8 B.E.12's, and 3 B.E.12B's.

pilot who kept up the attack and, within a short time, the enemy aeroplane burst into flames. Captain Brand was so close when this happened that his face was scorched. He watched the Gotha crash near the sea wall close to Harty Ferry where it was destroyed with its crew.

Another Gotha was first attacked on its inward passage across Essex by Captain D. V. Armstrong in a Sopwith 'Camel' of No. 78 Squadron, but, although the British pilot fired all his ammunition into the bomber from close range, the Gotha continued on its way to London. It was, however, seen over Hainault Forest by Lieutenant A. J. Arkell and Air Mechanic A. T. C. Stagg who were in a Bristol Fighter of No. 39 Squadron and were attracted to the bomber by the bright light of the engine's exhaust flames. They were at 10,000 feet and they promptly attacked the Gotha at close quarters from underneath. The Gotha began to lose height and when it was at 1,500 feet, still under attack, it burst into flames and crashed into an open space at Roman Road, East Ham: two of the crew threw themselves from the burning aeroplane as it fell, and they, like the third member who went down with his aeroplane, were killed. A seventh Gotha, forced down by engine trouble after manœuvring to avoid anti-aircraft gun-fire, made a rough landing on farmland near Clacton and one member of the crew was killed. There were, in addition, many indecisive encounters and most of the crews who returned safely to Belgium had lively stories to tell of their reception over England. One Gotha crashed near its home aerodrome on its return. This attack ended the German aeroplane campaign. On only three subsequent occasions, before the war ended, did an enemy aeroplane cross the English Coast, each time without dropping bombs. On the 17th of June one came in at noon at a great height over Broadstairs and Margate, another, similarly, on the 18th of July, and the last made a brief appearance over Deal two days later. According to the German authority, Major Freiherr von Bülow, the pressure of events in France led to the cessation of raids on England, and the bombing squadrons were exclusively engaged, from May onwards, on the Western

front. In August 1918 the German High Command ordered, 'on military and political grounds', that the bombing campaign against Paris, as well as against London, was to cease.¹

The Last Zeppelin Attack

There was one more attack, by airships, in which *Map 9*
Fregattenkapitän Peter Strasser, the German airship leader, met his end. In the evening of the 5th of August the barometer was at 29.60 inches, and was falling: the sky was overcast, and there was intermittent rain inland. No air raid had before been attempted with the barometer so low, and there is no doubt that the weather was unfavourable for an attack by Zeppelins. In the afternoon of the 5th, the *L.53*, *L.56*, *L.63*, *L.65*, and *L.70* had left the north German sheds for the Midlands. The *L.70*, the latest addition to the naval airship fleet, had only been commissioned on the 8th of July and, with her seven 290 horse-power Maybach engines, was the highest-powered Zeppelin produced during the war.

At 8.10 p.m. three of the airships were sighted from the Leman Tail lightship. They were the *L.70*, commanded by Kapitänleutnant von Lossnitzer with Fregattenkapitän Strasser on board, and the *L.53* and *L.65*. The other two ships were farther south, nearer the coast, and were heard north of Yarmouth at 9 p.m. At 9.5 p.m. a D.H.4 aeroplane left the Yarmouth aerodrome with Major E. Cadbury at the controls and Captain R. Leckie at the Lewis gun in the observer's seat, both of them pilots of night-fighting experience. The visibility to the northward above the clouds was exceptionally good, and Major Cadbury sighted three Zeppelins about forty miles away steering south-west at slow speed. As the D.H.4 moved to intercept them it must have passed near the *L.56* and *L.63* which had turned north near Yarmouth

¹ The detailed defence arrangements in the London Air Defence Area, as they existed towards the end of the war, are well shown in two Operation Orders by Major-General E. B. Ashmore, reprinted as Appendix VIII. For the Warning Control Organization, as it was at the end of the war, see *Map*, p. 134.

and were moving along the Norfolk coast in the direction of the remaining three Zeppelins. Here is Major Cadbury's report:

'Immediately on leaving Yarmouth, I sighted three Zeppelin airships to N.E. distant about forty miles, steering west at a slow speed, and I gave chase.

'At approximately 21.45 the Zeppelins, which were flying in "V" formation, altered course North. At 22.10 Zeppelin abeam 2,000 feet above us at 17,000 feet. At 22.20 we had climbed to 16,400 feet, and I attacked Zeppelin head on, slightly to port so as to clear any obstruction that might be suspended from airship. My observer trained his gun on the bow of the airship and the fire was seen to concentrate on a spot under the Zeppelin $\frac{3}{4}$ way aft.

'The Z.P.T.¹ was seen to blow a great hole in the fabric and a fire started which quickly ran along the entire length of the Zeppelin.

'The Zeppelin raised her bows as if in an effort to escape, then plunged seaward a blazing mass.

'The airship was completely consumed in about $\frac{3}{4}$ of a minute. A large petrol tank was seen to become detached from the framework and fall blazing into a heavy layer of clouds at about 7,000 feet below.

'On seeing the fate of their companion, the remaining two Zeppelins immediately altered course East and proceeded in that direction at a high speed.

'At this moment, my engine cut out completely, owing, I presume, to a temporary block in the petrol system. I managed to get my engine going again, and closed second Zeppelin. I again attacked bow on and my observer opened fire, when within 500 feet of airship. Fire immediately broke out in the midship's gondola. At this point my observer's gun jammed owing to a double feed which in the darkness could not be cleared. The fire on the Zeppelin became extinguished. I maintained contact with Zeppelin for approximately five minutes while my observer attempted to clear jam, but without

¹ 'Z.P.T.' refers to the Pomeroy tracer bullet in use at this time, known as the P.S.A. Mark II.

'success. I was unable to use my front gun, as I had reached my ceiling.

'Course was altered to S.W. and after flying for twenty-five minutes at 100 m.p.h., and having passed through four layers of thick clouds, the lowest being about 5,000 feet, I sighted flares of a night landing ground and landed at 23.05 at Sedgeford and reported to base.'

The *L.70* fell close to the schooner *Amethyst* near which some of her bombs had already exploded. The second Zeppelin, which luck alone saved from destruction, was the *L.65* (Kapitänleutnant Walter Dose). It was known, long afterwards, that what appeared to be an outbreak of fire in the gondola of the *L.65* was a flash of light temporarily revealed by the sudden raising of the black curtain in the gondola by a member of the crew. It was also known that the gas-bags of the ship were perforated by bullets from the D.H.4. Several other aeroplanes were in the neighbourhood, but none of them could get close enough to attack.

So far as can be judged from the German official records, the airship commanders were deceived by their wireless reports into a belief that they were farther west than they were. They believed they attacked batteries near Grimsby (*L.63*) and King's Lynn (*L.65*), and also the towns of Boston (*L.53*) and Norwich (*L.56*). No bombs were dropped on land, but if the German wireless stations were responsible for bombs falling harmlessly in the sea, it might fairly be said also that they saved other Zeppelins from destruction, for had the airships come over land it is difficult to see how they could have avoided encounter with the many aeroplanes in their path fully capable of attacking them at any height.

One of the Zeppelins, the *L.56* (Kapitänleutnant Zaeschmar), delayed her attack until some time after the other commanders had turned for home. She was off Yarmouth about 11.45 p.m. and dropped a number of bombs in the sea near the town. She then came over land north of Lowestoft, crossed the town, although her commander was unaware that he was doing so, and then went out to sea again, where another group of bombs fell.

No searchlights or anti-aircraft gun-fire opened on the *L.56*, and to this precaution the immunity of Yarmouth and Lowestoft was probably due.

Through some acoustic peculiarity of the atmosphere the noise of the explosion of the bombs dropped by the various ships, all of them at sea, was heard at places up to 115 miles distant. In each instance, it was assumed that the bombs were much nearer than they were. For example, the bombs which fell from the *L.56* off Lowestoft were heard at Bedford, 95 miles away, and at Weedon, 115 miles distant, but Weedon reported them sixteen miles to the east. One result of the unusual acoustic conditions, which made it appear that the Zeppelins were well over land, was that warning was given to a wide area in the Midlands, where all air-raid precautions were taken. Many pilots ascended on patrol from the inland aerodromes, but they saw nothing, and one of them was killed owing to his aeroplane crashing. Two aeroplanes attached to the Navy (Lieutenant G. F. Hodson in a Sopwith 'Camel', and Captain B. G. Jardine and Lieutenant E. R. Munday in a D.H.9) failed to return from patrol, and were presumably lost at sea.

The death of Strasser at the head of his squadron, in the last attempt by the Zeppelins to raid the towns of England, was a fitting end. A good organizer and a natural leader of men, he made and inspired the German naval airship service. His aim, as his operation orders show, was to inflict military damage, and if the achievements of his service were sometimes different from what he hoped and believed, those who have navigated the skies under comparable conditions will know how to make allowances.

*Air-raid Shelters*¹

A problem which became of increasing importance as the war progressed was the provision of shelter for the civilian population when air attacks were threatened. People in the East End of London, who were almost

¹ A book setting out the effect of bombs on some of the London buildings was published by the British Fire Prevention Committee in 1923 under the title *Air Raid Damage in London*.

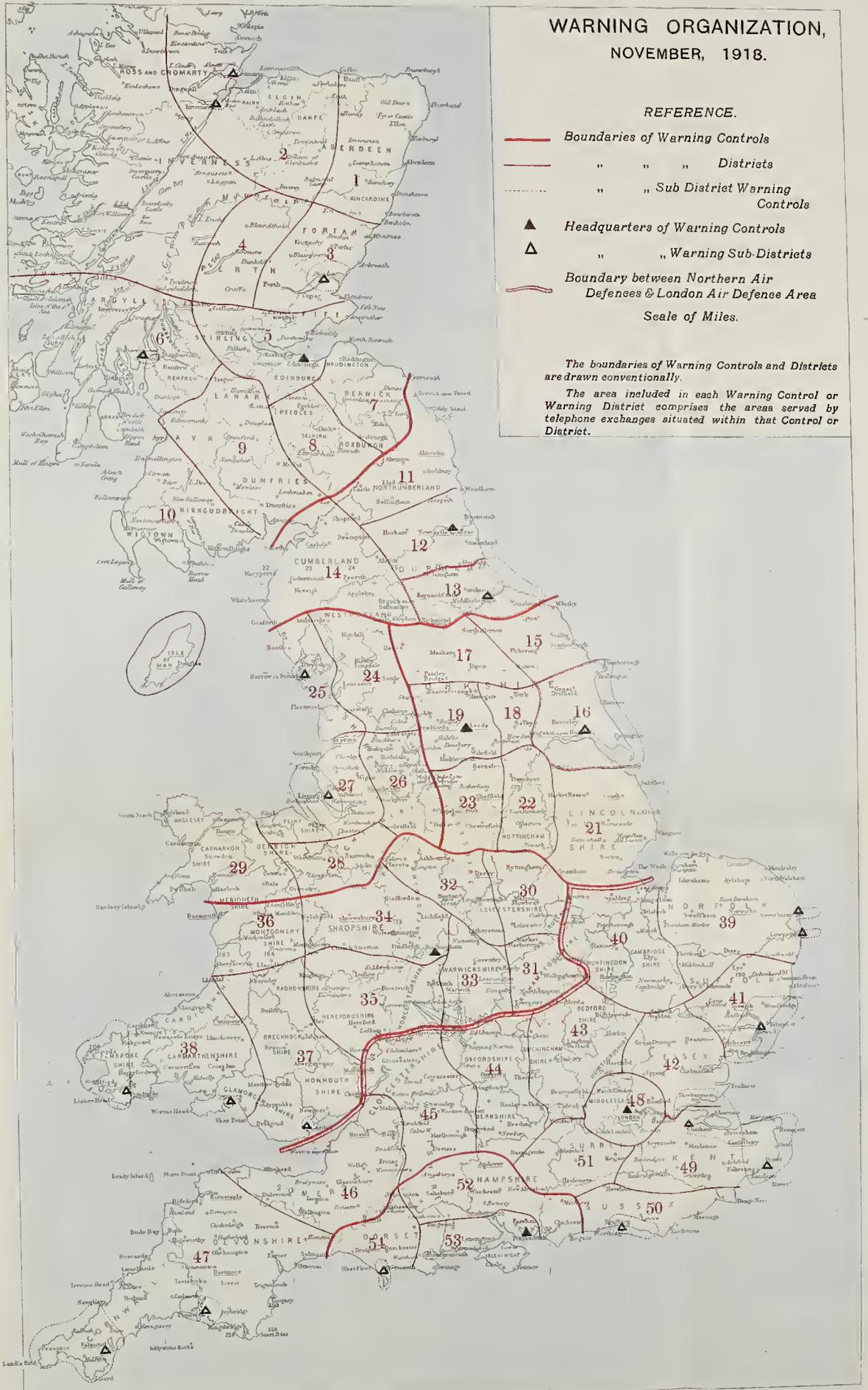
WARNING ORGANIZATION, NOVEMBER, 1918.

REFERENCE.

-  Boundaries of Warning Controls
 -  " " " Districts
 -  " " " Sub District Warning Controls
 -  Headquarters of Warning Controls
 -  " " " Warning Sub-Districts
 -  Boundary between Northern Air Defences & London Air Defence Area
- Scale of Miles.

The boundaries of Warning Controls and Districts are drawn conventionally.

The area included in each Warning Control or Warning District comprises the area served by telephone exchanges situated within that Control or District.





always in the path of the raiders, knew that the small houses in which many of them lived afforded little or no protection even against bomb splinters or pieces of anti-aircraft shell, or, indeed, against a moderate shock from a distance. A small section of the population in the eastern districts was also inclined to panic. It became clear to the authorities, in the autumn of 1917 particularly, when the moonlight aeroplane attacks began, that there would be a movement from the east of tens of thousands of people in search of shelter on any night when an attack appeared possible. Those who were urged by fear to get under cover were not content to await the usual warning before setting out. They had often to face long journeys across London and knew also that there would be competition for the best places, so they watched the skies to see whether the atmospheric conditions and the state of the moon appeared favourable for raiding, and if they judged that an attack was possible they took their portable and precious belongings, and a few things for their comfort, and set their faces to the west.

It was chiefly towards the west they went because that was not only the shortest way out of the danger area, but one well endowed also with shelters. Most popular of all were the ninety or so stations of the Underground railways, and, soon after the daylight aeroplane campaign began in the middle of 1917, the Commissioner of Police was compelled to make arrangements for police to be sent to all Underground stations, when air-raid warnings were given, to help marshal the crowds. The stations were usually closed after the last trains had left, somewhere between midnight and 1 a.m., but, with the authority of the War Cabinet, they were reopened and lighted if warning of a raid was given after the usual closing times. The cost of maintaining the staff on duty, and of the additional lighting, was met from the Metropolitan Police Fund. At times, especially in the autumn of 1917, the wanderers took up their places long before a warning was given, and they continued *in situ*, whether or not a raid took place and irrespective of formal closing times, until they judged that all possible danger was at an end. An extract from

a police report of a visit paid to Old Street Underground Station at the end of September 1917 will illuminate the conditions of the time. 'It was difficult', says the report, 'to alight from the train and move along the platform 'because of the crowd. The rear ranks were sitting with 'their backs to the wall, and the front ranks standing. All 'the corridors were blocked, with barely room for one to 'move along in single file. The staircases were solid with 'people. I estimate that there were 3,000 people on the 'platform, and altogether not less than 10,000 in the 'station.'

The tunnels under the Thames, at Woolwich, Greenwich, Blackwall, and Rotherhithe, also became favourite shelters which kept police specially employed regulating the crowds. Many people made their way into the western suburbs of London, where they passed the night, and this practice, which became marked in the summer and autumn of 1917, caused embarrassment in the districts which were visited. The need for shelters, which would be at least splinter-proof, distributed over different parts of London in order to check congestion at particular points, was obvious. The Commissioner of Police therefore decided to allow police stations to be used as shelters, and Government Departments, and authorities in charge of other public buildings, were invited to do the same and to exhibit a placard, *Air Raid Shelter*, outside the building as soon as the *Take Cover* notice was issued, especially at night. As a result, accommodation was made available for about 900,000 persons, but in many parts of London, especially the poorer districts, the available shelter remained insufficient. The Government, therefore, set up a committee, under the chairmanship of the Home Secretary, to consider the problem. Among the proposals which the Committee investigated was one to build public dug-outs in the parks, but in their report dated the 11th of October 1917 they rejected this proposal because material and skilled labour could ill be spared and because dug-outs, which would be no more than splinter-proof, would not offer greater protection than a building. The Committee recommended that the arrangements for using suitable buildings should

be extended, and suggested that a Defence of the Realm regulation should be made to empower competent authorities to require any premises to be made available as shelters during air attacks. The recommendations were approved by the Government, and the necessary regulation was included in an Order-in-Council made on the 23rd of October 1917. The opportunity was also taken to include in the Order another regulation which empowered the authorities to instruct owners to erect hoardings in front of damaged property. This was done on the advice of the Commissioner of Police in order that damaged buildings might not remain open to the gaze of passers-by or sight-seers who would be reminded of the dangers of air attack.

In the task of classifying buildings which might be used as air-raid shelters, the Commissioner was assisted by a committee of surveyors and of officers of the Royal Engineers who concentrated first on the Bow Division of the Metropolitan Police District and reported that there were enough suitable buildings to accommodate all who might wish to use them. The Committee proposed that in such of the buildings as did not already offer adequate protection, windows and other openings should be sand-bagged under the direction of the local authority. They suggested that the choice of buildings suitable as air-raid shelters in other districts should be the responsibility of local surveyors who could be guided by general rules which the Committee would set out as a result of its experience when surveying the Bow Division. The proposals were approved and, on the 20th of November 1917, the Commissioner of Police issued full particulars by circular to all local authorities in the Metropolitan Police District. They were told that they might purchase sand-bags, on an approved scale, at the rate of $2\frac{1}{2}d.$ each, plus ten per cent., but shortly afterwards the Government decided to issue sand-bags free of charge up to a total cost of £25,000 (two million bags). The local authorities fought hard to make the cost of labour and material, other than sand-bags, a charge on national instead of local funds, but their arguments were resisted by the Treasury, which

also refused to meet the cost of dismantling the shelters after the armistice.

Outside London there was a considerable amount of spasmodic work on the provision of air-raid shelters. In the Midlands and the North, mine workings and colliery drifts were sometimes used. In the Isle of Thanet, caves, disused chalk pits, and other subterranean passages were opened up and improved, often with the assistance of the local military authorities.

The VI Brigade

An account of the organization of the defence squadrons will be of interest to the service student. At the end of 1916 there were eleven squadrons and one reserve squadron which made up the Home Defence Wing under Lieutenant-Colonel F. V. Holt, who had his head-quarters at Adastral House on the Victoria Embankment.¹ At the beginning of February 1917, Lieutenant-Colonel Holt went overseas and was succeeded by Lieutenant-Colonel T. C. R. Higgins, who continued in the command throughout the remainder of the war.

In March 1917 there was decentralization, the squadrons being grouped into two wings, Northern and Southern, controlled from Adastral House by what was newly called the Home Defence Group Head-quarters. The next changes were brought about as a result of the German daylight aeroplane bombing campaign. On the 19th of July, Lieutenant-Colonel T. C. R. Higgins proposed that five additional home defence squadrons should be formed for day fighting. He pointed out that the existing squadrons were responsible for day and night fighting, for wireless co-operation with coastal batteries, for wireless tracking, and for certain specified duties in the event of an attempted invasion. 'It seems evident', he said, 'that one squadron 'commander cannot sufficiently supervise the administration, training, and operations entailed by these various 'duties which involve totally different classes of pilots and 'machines. Moreover, it is undoubtedly essential that the 'squadron commander of a day defence squadron should

¹ Formerly de Kaysers' Hotel, afterwards rebuilt as Unilever House.

'lead his eighteen machines during a raid.' It happened that on the day this letter was written, Lieutenant-General J. C. Smuts made his report, dealing with problems of home defence, to the War Cabinet.¹ In that report he advocated the formation of three day-fighting squadrons, and Government sanction was given to this proposal in due course, the squadrons being formed in July and August.

A further result of the report of Lieutenant-General Smuts was the appointment of Major-General E. B. Ashmore to command the newly organized London Air Defence Area. In accordance with proposals put forward by this officer the defence squadrons, in September, were reorganized into a Home Defence Brigade made up of three wings, northern, eastern, and southern. The Southern Wing, for night operations, and the Eastern Wing, for day operations, were in the London Air Defence Area. The Northern Wing was to be confined to night operations. In October the Home Defence Brigade, now renamed the VI Brigade, comprised: the Northern Home Defence Wing (Forty-sixth) with head-quarters at York; the South Midland Home Defence Wing (Forty-seventh), newly formed with head-quarters near Stamford²; the North Midland Home Defence Wing (Forty-eighth), which, however, was not organized until January 1918 (head-quarters, Gainsborough); the Eastern Home Defence Wing (Forty-ninth), with head-quarters at Upminster; and the Southern Home Defence Wing (Fiftieth), with its head-quarters at Adastral House, London.

When two additional fighting squadrons were sanctioned, in December 1917, for the London Air Defence Area, it was stated they would be No. 141, raised from No. 61 Squadron, and No. 143, raised from No. 112 Squadron. General Head-quarters, Home Forces, subsequently pointed out that the organization of the defence squadrons in

¹ See p. 42.

² Owing to the creation in the Midlands of four new depot squadrons to train pilots in night flying, including those for service overseas, it had been decided to divide the Midland Home Defence Wing into two, North and South.

the south-east of England into Southern (Fiftieth) and Eastern (Forty-ninth) Wings did not conform with their tactical disposition, and that the two additional squadrons would bring the numbers in these two wings to ten active squadrons and one training squadron, which appeared too many for effective administration. The existing tactical grouping of the defence squadrons was as follows:

- (i) a group near London for the immediate protection of the capital;
 - (ii) another in Essex and Suffolk to form advanced defences north of the Thames;
- and (iii) a third in Kent as the advanced defence south of the Thames.

General Head-quarters proposed that each of these tactical groups should constitute a wing, and that the other three wings of the Brigade, in the Midlands and the North, should be formed into a separate group with its head-quarters at York. An additional wing was approved, but not the regrouping at York. The Fifty-third Wing, therefore, consisting of Nos. 50, 112, and 143 Squadrons, came into being on the 8th of February 1918, with its head-quarters at Harrietsham in Kent.

On the formation of the London Air Defence Area in August 1917, the operational squadrons which came under the command of Major-General Ashmore were those approximately south of the Wash. North of this line the defence squadrons continued to be under the control, for operations, of the Garrison Commanders of the Humber, the Tees, the Tyne, and Edinburgh, who gave squadron commanders information about the movements of hostile aircraft, upon receipt of which defence aeroplanes were sent on patrol. In May 1918, however, a Northern Air Defence Area, under Brigadier-General P. Maud, was formed to operate in a similar manner to the London Air Defence Area. When this was done the operational squadrons north of the Wash were organized into the Northern group of the VI Brigade, to work under the orders of the G.O.C., Northern Air Defence Area. The remaining operational squadrons of the Brigade formed a

Southern Group under the control of the G.O.C., London Air Defence Area.

At that time there were ten night-training squadrons in the Brigade, and these continued to be under the direct control of the General Officer Commanding the Brigade who was responsible to the Director of Training at the Air Ministry.

It has already been indicated that the VI Brigade had duties other than that of protection against air attack. One great responsibility of the Brigade was the training of pilots in night flying. Up to February 1917 pilots for night work were chosen from those who had already graduated in a day-training squadron. The course in night flying was short and consisted chiefly of five flights in the dark, and instruction in the use of the armament then employed against airships. From November 1916 pilots had, additionally, to pass through a course of firing Le Prieur rockets at a target, resembling a Zeppelin, marked on the ground, and in firing at toy balloons with a Lewis gun from an aeroplane.

In February 1917 the night-training reserve squadron (No. 11) was transferred from Northolt to Rochford and was renamed No. 98 Depot Squadron. At first pupils were accepted after they had passed through an elementary day-training squadron, but for various reasons this practice did not prove satisfactory, and pupils were subsequently sent direct to No. 98 Depot Squadron from schools of military aeronautics. The tests which a pupil had to pass if he was to be retained for home defence cannot be described as exacting. He had to satisfy certain standards in day flying, and, in addition, was required to make six landings after dark, attain a height of 6,000 feet at night, and remain flying at that height for an hour.

In February 1917 No. 100 Squadron was formed from pilots of the VI Brigade for night-bombing duty in France. Few of the pilots had flown F.E.2b's, the aeroplane with which No. 100 Squadron was to be equipped, and they were therefore put through a hurried course of training on this type of aeroplane before the squadron went overseas. About this time it became clear that the

one depot squadron could not train all the pilots required for home defence, apart from such as would be required from time to time for overseas, and, in April 1917, the home defence squadrons began to take pupils for direct training, a process which was recognized as unsatisfactory, but had to be resorted to, temporarily, because No. 98 Squadron could not cope with the work.

Soon after No. 100 Squadron had gone to France, the overseas experience of the pilots of the squadron prompted additional training in night flying at home. Orders issued to home defence squadrons in April 1917 stated that all pilots must be practised at night in reconnaissance, bomb-dropping, and in flying in searchlight beams. In June it became necessary to form a new depot squadron, No. 99, to train pilots for overseas. The squadron was formed at Rochford, but moved to Retford in the following month and was renumbered No. 199 Depot Squadron, No. 98 becoming, at the same time, No. 198 Depot Squadron. Meanwhile an additional Depot Squadron, No. 200, had been created at Retford at the beginning of July. It was not long before further expansion was necessary because of increased demands from France for night-flying pilots, and a new depot squadron, No. 192, was formed in September 1917.

At the end of 1917 the depot squadrons were renamed Night Training Squadrons, and four new ones, Nos. 188, 189, 190, and 191, were formed.¹ The home defence squadrons became service squadrons, and, except No. 75, all of them in the three wings in the south of England were equipped by the end of the year with single-seater fighters, the pilots for which came to them from the night-training squadrons.

In the north the position was less advanced. Those service squadrons which had B.E. type aeroplanes were still training their own pilots who joined the squadrons from schools of aeronautics. Pilots for the F.E. squadrons received preliminary instruction in a night-training squadron. The F.E. type aeroplanes were not, it was recog-

¹ On the 1st of April 1918 two additional night-training squadrons were formed, namely Nos. 186 and 187.

nized, effective weapons against raiding aircraft because of their comparatively low ceiling. It was decided, therefore, early in 1918, to re-equip the northern service squadrons with Avros fitted with 110 Le Rhone engines. Used as a single-seater this type could reach a height of 18,000 feet, and there was the added advantage that pilots who had become accustomed to flying the Avro, with its rotary engine, could soon learn to handle the Sopwith 'Camel' and would therefore be available for transfer, if and when required, to southern service squadrons.

The first night-fighting squadron for service overseas, No. 151, was formed at Hainault in June 1918, and was sent to France the same month, equipped with Sopwith 'Camels'. The introduction for training purposes, in September 1918, of Sopwith 'Camels' fitted for dual control made it possible to pass out qualified pilots at an increased rate and also considerably reduced the number of flying accidents.

One difficulty in training night pilots in the south of England must be noticed. Because of fear of causing false alarms of enemy air attacks it was considered impracticable to send pupils on cross-country flights at night. In May 1918, therefore, dark goggles were introduced to give the pupil-pilot the impression of flying at night. Wearing the goggles he made a cross-country flight by day in a two-seater aeroplane with his instructor as passenger.

Under a revised Air Ministry scheme of training in June 1918, pupils in the southern squadrons graduated in training squadrons equipped with Avros, Sopwith 'Pups', and Sopwith 'Camels'. They had to complete twenty-five hours solo, including four hours night flying, part of it on a service-type aeroplane. They had also to pass tests in air navigation, wireless telegraphy, day and night ground gunnery, and in the cross-country flight when wearing dark goggles. After graduating, pilots passed to service squadrons, where they had to complete tests in advanced gunnery and in air fighting. When they had passed these tests to the satisfaction of their squadron commanders they were given their wings and classified as Second Class Operations pilots. Their training,

however, was still incomplete. Up to June 1918 orders were conveyed to pilots already in the air by means of ground signalling panels which could be read, so long as the weather was clear, up to about 17,000 feet. From June, however, this method of signalling was replaced by wireless telephony, and a School of Wireless Telephony was opened at Penshurst.¹ To this school Second Class Operations pilots from the service squadrons were sent. When they had completed the course they returned to their squadrons and received further instruction in night fighting in service aeroplanes until considered by their squadron commander to be fully qualified to ascend in the event of a hostile air raid. They were then classified as First Class Operations pilots and became available, if and when required, for posting to night-fighting squadrons overseas.

The VI Brigade, then, not only trained its own pilots in night flying, but was responsible also for training fighting, reconnaissance, and bombing pilots for night work overseas. The brigade had other duties. It had its assigned part in a scheme of defence to meet an attempted invasion. So early as August 1916, *Emergency Flights* had been allotted for work with the then northern and southern armies if an invasion were attempted. Up to January 1917 the provision of reconnaissance aircraft was all that was contemplated, but additional arrangements were then made for the bombing of enemy transports. As time went on the part which the squadrons of the VI Brigade were expected to play in emergency expanded until, in the final invasion scheme, they had to be prepared to undertake reconnaissance, bombing of transports, photography, co-operation with infantry by means of contact patrol, and observation of fire for coastal batteries and for field artillery. Liaison with the military commands was maintained by what were called 'representative officers' who were attached to the head-quarters of the military force as technical advisers on air service questions.

¹ By the end of the war the movements of home defence squadrons in the air were controlled by Home Forces through a wireless transmitting station situated at Biggin Hill, Kent.

In 1916 and for most of 1917 the representative officers were the senior squadron commanders in each military area, but in October 1917 the senior wing commanders undertook this duty except in the Scottish Command, where the officer commanding No. 77 Squadron continued to act as the representative officer. In December 1917 the units of the Training Division and of the Royal Naval Air Service had been included in the invasion scheme to provide reinforcements for the squadrons of the VI Brigade should the necessity arise.

The responsibility of the home defence organization to provide air observation of fire for coastal batteries required much detailed work. The question had first been raised by General Head-quarters, Home Forces, in October 1916 in anticipation that the guns to be mounted in 1917 would be capable of fire up to a range of 25,000 yards and would therefore need observation from the air. At a conference between Royal Artillery and Royal Flying Corps officers, held in November 1916, it was decided that the Home Defence Wing should provide one aeroplane and one wireless receiving station for each 9·2-inch battery on the East Coast and at Portsmouth, and should arrange for landing-grounds within ten minutes' flight from the battery. The Royal Garrison Artillery was to provide officer observers and wireless operators. Owing chiefly to a shortage of wireless equipment, little progress was made with the scheme until April 1917, but during the remainder of that year much was done and, by the end of 1917, all 9·2-inch batteries and a few 6-inch had been provided with wireless receiving stations manned by Royal Flying Corps operators. About thirty men of the Royal Garrison Artillery had been trained as assistant wireless operators, while an average of six officers from each garrison had passed through a course in air navigation. Some successful test shoots had been made, but it was clear that little further progress would be possible until the liaison between the Royal Flying Corps and the Royal Garrison Artillery became closer, and methods of observation had been standardized. In January 1918, therefore, a school of

aerial co-operation with coast defence batteries was formed at Gosport from a Flight of No. 39 Squadron. The object was to make trials with the Golden Hill Artillery School in various methods of observation, and with range-finders, &c. By August 1918 sufficient progress had been made, both in methods of observation and in organization, to enable a system to be laid down. This was embodied in a pamphlet, *Co-operation of Aircraft with Coast Defence Artillery*, issued the same month. By November 1918 wireless stations had been erected for twenty-three batteries in the various garrison commands from the Forth to Dover and Portsmouth. Observers used an aircraft range-finder, designed by Dr. F. A. Lindemann of the Royal Aircraft Factory, by means of which the batteries could be expected to get their first few rounds near their invisible target. The observer in the air, within view of the battery and of the target, read certain angles on his range-finder and transmitted the results, by wireless, to the battery commander's post, where the range and training were quickly plotted. Once fire had been opened, the observer signalled corrections by the clock-code, the imaginary twelve-six line running from bow to stern of the target vessel.

The scheme was not tested in action, but its disadvantages were not overlooked. In an enemy bombardment of the tip-and-run kind there would have been little time to get the aeroplane into the air and go through the procedure of range-finding. The range-finder, even allowing that the aeroplane was in position, required good visibility to enable the readings to be made, but clear conditions could not often be expected off the coast of England. Furthermore, if weather conditions were good, smoke screens would probably be laid by bombarding vessels and so make instrument-reading and observation difficult. Finally, if the air observer, in spite of these various difficulties, could still obtain his angles, the degree of error, at ranges up to 30,000 yards, and such ranges had to be considered, would be great. The opinion of the Air Staff at the end of the war inclined to the belief that torpedo-carrying aircraft would prove the most economical

and effective method of dealing with long-range bombardment from the sea, except at defended ports where sufficient fixed guns might be retained to meet any determined enemy efforts to approach within a range of 10,000 yards or less.

Some of these matters, important as they were, have little to do with the story of the defence of the country against enemy aircraft, but because the home defence squadrons were responsible, it is right that some account of their various additional duties should be given. It must, however, be pointed out that the system had serious drawbacks. The home defence squadrons existed to defend the country against attack from the air, and it was not reasonable to expect that they might be given many other duties, entirely different in kind, and yet attain to proficiency in all of them.

Aeroplanes and Armament

Up to the end of 1916 the defence aeroplane was chiefly the B.E.2c armed with a Lewis gun, firing, in the latter part of 1916, incendiary and explosive ammunition. B.E.2e's and B.E.2d's fitted, like the 2c, with 90 horse-power Royal Aircraft Factory engines, were also in use. Towards the end of the year a few B.E.12 (140 horse-power R.A.F. engine), B.E.12a, and F.E.2b (120 or 140 horse-power Beardmore engine) aeroplanes were allotted to some of the home defence squadrons. The B.E.12's, which were single-seaters, carried a Vickers gun on the side of the fuselage, synchronized to fire through the propeller, and a Lewis gun on a Strange gun-mounting. The Vickers fired ordinary ammunition with one round of Sparklet in five, while the Lewis was loaded with incendiary and explosive ammunition. In 1917 a few F.E.2d's with Rolls-Royce engines of 250 or 275 horse-power were also taken into use.

About March 1917 the first suitable night sight was invented by Sergeant A. E. Hutton of No.39 Squadron. Radium and luminous paint had been tried, but on dark nights it proved too bright, and it failed to show up when there was a moon. The Hutton sight was of the

bead foresight and V backsight type. The bead was pierced with a pin-point hole and was illuminated by a red electric bulb in the stem of the sight. The V backsight was pierced by three pin-point holes, one in the extremity of each arm of the V and one at the base, and was illuminated by a green electric bulb, the source of the light for both sights being a 2-volt battery of the kind used in flash lamps. About the same time, the Strange gun-mounting was superseded by an Admiralty Top Plane Mounting, the invention of a naval officer, which had for some time been in use in the Royal Naval Air Service: it enabled the pilot to fire direct to the front over the top plane by means of a Bowden cable attached to the control lever of the aeroplane.

The F.E.2b aeroplane, a two-seater pusher, was fitted with a Lewis gun on an Anderson mounting. A few carried one-pounder pompom guns, and two had .45 Maxim guns, but none of these was ever in action against the enemy.

Such was the position when the German daylight aeroplane raids brought about a change. The immediate result was the allotment of a number of Armstrong-Whitworth (160 horse-power Beardmore engines) and R.E.8 two-seater aeroplanes to some of the defence squadrons. They were armed for day and night work with one Vickers gun for the pilot fitted with a Constantinesco gear, and a Lewis gun for the observer on a Scarff Ring Mounting. For night work they made use of the Hutton sight. These aeroplanes were soon replaced by Sopwith 'Pups' (100 horse-power Monosoupape) and by Sopwith $1\frac{1}{2}$ strutters (130 horse-power Clerget), the latter a two-seater similarly armed to the Armstrong-Whitworth's and R.E.8's. Many attempts were made to fit the Sopwith 'Pup' with a Lewis gun to fire over the top plane, but little success was achieved. In their turn, these aeroplanes were replaced by Sopwith 'Camels' (110 horse-power Le Rhone) and Bristol Fighters (200 horse-power Rolls-Royce Falcon Mk.3). The Sopwith 'Camels' were originally fitted with two Vickers synchronized guns, but owing to the danger of firing explosive and incendiary

ammunition in Vickers guns through the propeller, alterations in some of the 'Camels' were made to enable two Lewis guns to be fitted on Foster gun mountings: this was done by moving the pilot's seat farther back. The advantages were twofold. The Lewis guns could be loaded with incendiary ammunition, when required, without danger, and they could be fired at an angle of 45° . This latter advantage was of some importance. Trials which had been made at the Experimental Station at Orfordness had revealed that a bullet fired from a Lewis gun at an angle of 45° , from an aeroplane travelling at 100 miles an hour, kept a straight course up to 800 yards. The reason was that the resistance of the air, under these conditions, equalled the force of gravity. One of the home defence pilots, firing a Lewis gun at this angle, obtained 90 per cent. of hits on a towed target at ranges between 500 and 600 yards, a degree of accuracy far greater than could be obtained by direct firing.

In 1918 some S.E.5a's (200 horse-power Hispano-Suiza or Wolseley 'Viper' engine) were used for home defence. They were fitted with a Vickers synchronized gun and with a top plane Lewis gun on a Foster mounting. The Bristol Fighter also had a Vickers for the pilot and a Lewis on a Scarff Ring for the observer. For the Lewis gun a 45° sight, fixed to the top plane, was used by the pilot. When he had put his aeroplane into position, that is to say when he had the enemy aircraft in his sights, he signalled to his observer who aimed direct at the enemy and opened fire.

A few Sopwith 'Dolphins' (200 horse-power Hispano-Suiza engines) were used by home defence squadrons in 1918, and in the latter part of the year Sopwith 'Snipes' were tried and found suitable for night fighting. The policy as the war came to an end was to equip all the home defence squadrons with the Sopwith 'Camel'. The objection to the S.E.5a and to the Bristol Fighter had nothing to do with their fighting qualities once they were in the air, but was solely that they proved difficult to land at night on small aerodromes. It seemed to be established that the rotary or radial type engines

were preferable to stationary water-cooled engines for night work, the ease with which they could be switched off for landing proving an advantage in the dark. Aeroplanes fitted with these engines could also be flown off the ground in an emergency at short notice in the coldest of weather.

The position at the Armistice was that seven home defence squadrons were completely equipped with Sopwith 'Camels', six (in the north) with Avros, and two with Bristol Fighters. One squadron only was mixed, having Bristol Fighters and Sopwith 'Pups', but this squadron was about to be re-equipped with Avros.

In September 1917 several combats which took place with enemy aeroplanes were indecisive, although it appeared to the Royal Flying Corps pilots and observers that their fire should have been effective. One reason for this was undoubtedly due to pilots and observers underestimating the range of the German aircraft, a mistake due to the comparatively large size of the enemy bombers. Another reason was the blinding effect at night of the flash of the gun. These difficulties were overcome. An illuminated ring sight was constructed of such a diameter that when placed at a suitable distance from the eye the ring would exactly span a Gotha type aeroplane at a distance of 100 yards. This sight, called the Neame Sight,¹ illuminated by electric bulbs in a similar manner to the Hutton Sight, was distributed to home defence squadrons in December 1917. Experiments at Orfordness led to a solution of the second difficulty. A flash eliminator was devised for fixing to the muzzle of the Lewis gun and, at the same time, Sparklet ammunition was discarded. Although it was efficient tracer ammunition, it was apt to explode prematurely and blind the gunner for a time sufficient to enable the enemy aircraft to escape. The incendiary and explosive ammunition did not suffer this drawback and was retained, but only for use against airships.

Many of the aeroplanes were fitted with magazines electrically heated from a generator, because experience had

¹ Invented by Lieutenant H. B. Neame, a member of the technical staff of the Air Ministry.

shown that incendiary ammunition (Buckingham and R.T.S.) did not always work effectively at low temperatures. The most favourable temperature was 80° F., and the magazine devised by the VI Brigade did not give a rise in heat of more than 70° above atmospheric temperature, so that at a height of 10,000 feet, where the atmospheric temperature was about 10° F. or below, the magazine would heat the ammunition to an average heat between 70° and 80° F.

In August 1918 proposals of the Air Council that the number of squadrons to be allotted for home defence should be twenty had been approved. In October 1918 sixteen squadrons were in England, two in Ireland, and two had yet to be formed. As the German armies were in retreat, however, the Air Council proposed that five squadrons of Sopwith 'Camels' should be maintained in France, 'in view of the heavy casualties and material 'damage caused by the enemy bombing of our back areas'. One squadron, No. 151, had gone overseas in June, another, No. 152, was about to be sent, and the Air Council proposed to send three more, thereby reducing the number of home defence squadrons to fifteen. The Air Council also proposed that a proportion of searchlights and sound-locators should go overseas with the squadrons because, they said, 'it is considered that great benefit 'would accrue from the co-operation which would be 'obtained by keeping intact the various units which have 'trained together in the perfecting of aerial night defence'. It was stated that all the Sopwith 'Camel' squadrons, at home and in France, would be replaced by Sopwith 'Snipes' from January 1919 onwards. Finally, it was proposed that the ten existing balloon aprons should be reduced to one with the object of releasing about 2,500 men for duty with Royal Air Force units overseas.

The Army Council welcomed these proposals which were duly approved. In a letter to the War Office, on the 4th of November 1918, the Air Council put forward more comprehensive proposals, saying, 'in the event of 'the enemy becoming sufficiently disorganized to render 'him unable to make a further stand against the Allied

'Armies, the Air Council is of opinion that every available resource at its disposal should be thrown into the 'battle with a view to assisting in the final destruction of 'the enemy military'. The Air Council proposed that if and when the aforementioned situation arose, all the home defence squadrons still in England should be sent to France, together with all efficient aeroplanes and skilled pilots on the strength of the training units. It was, however, pointed out that this withdrawal would disorganize the continuous supply of pilots to France and would not, therefore, be put into effect until it became obvious that a sustained output of pilots was no longer necessary. Again the Army Council approved the proposals, which received Government sanction on the 8th of November, but hostilities ceased before any of them could be put into effect, and the final reinforcement sent from the VI Brigade to France was No. 152 Squadron, which went overseas in October 1918.¹

The Air-raid Campaign—a Summary

The German air-raiding campaign has been surveyed and it is now possible to examine the balance sheet. On the question of morality little need be said here. Opinion during the war was divided, certainly in Germany, where some pleaded for air attacks on Great Britain directed solely towards the breaking of the spirit of the civil population, while others wanted the raids confined to objects of military importance. Long before the aircraft bomb was invented it was a military teaching that a nation resorted to war to impose its will on another nation, a statement of no great profundity, but one which has some advantage over another, at one time in common currency, that war is the sport of kings. Democracies, perhaps, get the sort of war they deserve. So long as war was confined

¹ Sir Douglas Haig had also asked, at the end of October, for 150 anti-aircraft guns and 150 searchlights. The reason was that, owing to the advance of the British armies in France, about 2,000 square miles of new territory had to be given protection from air attack. The guns and lights were available only in the home defence organization and their withdrawal was still under discussion when the war ended.

to strictly professional armies so long might a code of manners survive, but as soon as it became an affair of nations it was inevitable that popular clamour should often override purely military considerations.

Those in Germany, however, who expected that air attacks on cities would cow the population of England were disappointed. The raids were neither powerful nor sustained enough to test such a possibility. Their effect, in fact, was far otherwise. They led for the most part to a stiffening of the national temper. They were often used by the Government to stimulate recruiting and the national effort generally, but there were times also when the drive came from the opposite direction, when the attacks acted on public opinion until the Government were compelled to vitalize their air policy. The expansion of the air services during the war, and, ultimately, the creation of a separate service for the air, owed much to the atmosphere engendered by the bombs which exploded in English cities.

On military grounds, the air attacks were overwhelmingly justified by the results. In 51 airship raids, 5,806 bombs¹ were dropped which killed 557 persons, caused injury to 1,358, and inflicted material damage estimated at £1,527,585. There were 52 aeroplane attacks in which 2,772 bombs² killed 857 persons, injured 2,058, and caused damage to a total value of £1,434,526. These figures are important, but what mattered, from the purely military point of view, was the diversion of men and material to home defence. At the beginning of June 1918 there were in Great Britain, ready for action, 469 anti-aircraft guns, 622 searchlights, 258 height-finders, and 10 sound-locators (out of an establishment of 664), manned by 6,136 officers and men. The fighting strength of the operational squadrons of the VI Brigade was 376 aeroplanes, although no more than 166 are shown as efficient at the beginning of June 1918. The brigade absorbed the

¹ About 196 tons. This is a British estimate which includes all the bombs traced by us. German records show that more bombs were dropped, often 30 or 40 per cent. more, than we accounted for.

² British estimate, about 74 tons.

services of 660 officers, 3,639 men, and 315 women. The Balloon Wing, which worked the apron scheme, had a strength of 82 officers and 2,573 men.¹ Much material and labour were required to build the aerodromes, gun stations, air-raid shelters, &c., and tens of thousands of rounds of ammunition were assembled. The cost of an anti-aircraft shell varied, but it would probably not be far wrong if £2 was reckoned as the minimum all-in cost to the Government of a 3-inch shell. There were occasions, when barrage-fire was employed, during which 20,000 rounds or more of anti-aircraft ammunition were fired in one attack at a cost exceeding the material damage inflicted by the enemy bombs. As the life of a 3-inch gun was only some 1,500 rounds, the wastage of guns, reckoning a volume of fire of 20,000 rounds, was at the rate of thirteen or fourteen for the attack. When these various figures are considered, the strength of the German striking force should also be borne in mind. Up to May 1918 the greatest number of bombers which set out to attack England was twenty-seven. For the final raid, on the 19th/20th of May 1918, forty-three started. The whole British defensive organization was maintained to meet the threat from this comparatively small striking force and the more remote threat of occasional airship attacks.

Also of great military importance was the effect on the output of munitions and of factories generally. This was never confined to the places over which the German airships and aeroplanes flew, nor within the limits of time during which they were over this country. It often extended to areas remote from the scene of the bombing attacks, and endured long after the hostile aircraft had left our coasts. Official figures for some raids show that when an attack was in progress, seventy-five per cent. of munition workers, in areas warned of the attack, ceased

¹ The personnel figures quoted for guns, &c., are actual strength. They were, for guns and searchlights in particular, much below the establishment figures, chiefly because of the urgent need for reinforcements for France resulting from the German spring offensive. The establishment figures at the Armistice are given in Appendix IX, but the actual figures for this date are not available.

work, and that the output continued to be restricted for about twenty-four hours after the raid had ended.¹

So far as concerns the strategical employment of the enemy air raiding resources, it is possible to suggest mistakes made by the German High Command. There were three periods when the Germans enjoyed an advantage of which they failed to avail themselves fully. Up to the autumn of 1916 we were comparatively defenceless against the Zeppelins, but the attacks were so spaced that we were given time to get our breath in between, or, in other words, the effect of one raid had worn thin before we were subjected to another. It would have been of important military advantage to the Germans had they given airships priority of manufacture in the early days and put attacks on England in the forefront of their military policy. With the shooting down of Zeppelins in the autumn of 1916, the airship threat temporarily lost its sharpness, but the Germans once again took us by surprise when they began to raid, in 1917, with Zeppelins capable of reaching heights of 18,000 to 20,000 feet. It was not until September 1917 that a single-seater fighter was flown at night, and after this event a long time necessarily elapsed before selected pilots could be given sufficient training for night fighting on the unstable single-seaters. There was a period during which the high-flying airships could leave the defences, gun or aeroplane, out of their reckoning; and when efficient single-seater fighters were allotted to the home defence squadrons it was in the London area and in the south generally that they were distributed. To protect the industrial towns in the Midlands and in the north there were no aeroplanes capable of getting within reach of the new-type Zeppelins, and the German High Command had a unique opportunity, not only to inflict damage in those areas, but also to embarrass those responsible for the air defence of the country, who would have been hard put to it to equip the northern squadrons with up-to-date fighting aircraft manned by experienced pilots, and could, in any event, have effected such re-equipment only at the expense of the

¹ See the figures quoted on p. 87.

fighting line in France. The destruction of a number of airships in the disastrous explosions at the Ahlhorn Base, in January 1918, saved us something, but, even so, there seems to have been an unwonted timidity about the employment of the naval airships for attacks on England. The naval airship service itself was eager enough, and it must be assumed that the lack of drive was in higher quarters. It was no doubt due, in part, to the disasters which overtook some of the Zeppelins in the memorable raid of October 1917, disasters caused, it has been shown, by the abnormal atmospheric conditions of that night.

Finally, the Germans again had the advantages of surprise when they initiated the night aeroplane campaign in September 1917. It seems that they began this campaign with no very clear idea of the objects they wished to achieve. At first they aimed, apparently, at undermining the morale of the civil population, but, at the beginning of 1918, remembered the impending military offensive in France and planned, rather half-heartedly, attacks to reinforce the strength of the blow delivered on the Western front. But the German bombing force had dissipated some of its strength before the March offensive on the Somme began. It should be remembered that the German command had the initiative and that the place and time and objects of the Spring offensive in 1918 were of its choosing. A feature of that offensive was the thought and foresight brought to bear on all the details of the lengthy preparation. The general military situation was such that night-aeroplane raids on London in the autumn of 1917, no matter how successful, could only be in the nature of a serious nuisance. Provided always that the Germans intended to employ part of their bombing strength against England, and not to concentrate their entire resources on attacks on military objectives on the Western front, they should have held their hand. They should have accumulated their bombing forces and prepared, with the same acumen as they gave to their other preparations, for a campaign against England timed to exert its maximum effect when it would best help the military offensive in France. Although, in the meantime, it is to

be expected that the anti-aircraft defences in England would have been improved and strengthened, it would be going too far to assume that, without the stimulating effect of the September and October raids in 1917, those defences would have been adequate to meet a sudden and determined onslaught in, say, February or March 1918. We have seen that the German daylight aeroplane campaign against London created profound disquiet and led to demands being made on Sir Douglas Haig to send fighting squadrons home at the moment when he was about to begin his summer offensive in Flanders. A German night-bombing campaign against London in February or early in March 1918 might have had results leading to a popular clamour which the Government might have found themselves unable to withstand. The withdrawal of squadrons and material from the Western front might again have been deemed necessary. Certainly, had the attacks been continued and intensified after the blow had fallen on the British Third and Fifth Armies in France, the bombing would have struck at the morale of the people in England at the moment when the situation on the Western front was one of gravity. There can be no doubt that because the night-aeroplane attacks on England were not co-ordinated with the military offensive, they represented, to some extent, a waste of effort.

Finally, there is a matter of importance which the air-raid campaign illuminated. That is that so far as defence against air attack is concerned, an island state suffers a great disadvantage because of the opportunities for concealment and freedom offered by a sea approach. It is of interest in this connexion to compare the attacks on London and Paris. There were, in all, seven raids by Zeppelins and eighteen by aeroplanes on the County of London, as a result of which 594 people were killed and 1,708 injured. Paris was twice attacked by airships, and on forty-four occasions by aeroplanes, and the casualties were 278 killed and 636 injured.¹ Whereas, however, 10 airships and 116 aeroplanes reached and bombed

¹ The figures for the attacks on Paris are taken from *Les Bombardements de Paris, 1914-1918*, by Jules Poirier.

London, only two airships and about fifty aeroplanes succeeded in bombing Paris. One of the two Zeppelins and sixteen aeroplanes were shot down. It is estimated that some 500 German aeroplanes tried to reach Paris, and the fact that so few succeeded is ascribed to the difficulties of approach and departure. The German pilots had to cross the Allied lines on their inward and homeward journeys. They could not escape immediate detection, and the warning was such that there was usually ample time to deal with them during some part of their journey.¹ It was not possible for them, as in England, to come in over one part of the coast and go out over another. Nor did France offer such a wide choice of important alternative vulnerable targets as did England.

The need for look-out posts at sea, if the defence forces were to have a reasonable opportunity to combat the raiders, was felt in England during the war, and some attempts, already noted in this history, were made to obtain warning of the seaward approach of enemy aircraft. What seems obvious, however, is that had the aeroplane attacks gone on, or had the air raids in general not been of the diversion kind, it would have been found imperative to organize an elaborate system of warning posts at sea. The difficulties in the way of the establishment of such a system of observation would have been great, perhaps insuperable, and if what has been said is well-founded, the power of the air weapon to call into being interminable defensive activities, which might become so elaborate as to be almost intolerable, is emphasized. In other words, the aeroplane is an offensive weapon, and the advantage in war will go to that side which exploits its offensive qualities with trained imagination and in most determined mood. There must be defence aeroplanes because the people will always demand them and because, in any event, the enemy must be hampered as much as possible, but, used defensively, the aeroplane is little

¹ It is well to emphasize that the speed of modern aircraft is considerably greater than that of the aeroplanes with which the French had to deal in the war, and increases of speed are equivalent to a shrinkage of the area in which the defence can operate.

different from any other anti-aircraft weapon. In defence it cannot exercise the initiative, and without the initiative the peculiar qualities of the air weapon, speed and ubiquity, which give it the power to create a threat, continuous in its force and limited only in its scope by the radius of action of the aircraft, cannot be exploited. That is to say, the only defence in the air likely to be effective in the long run is an offensive more powerfully sustained than that conducted by an enemy.

CHAPTER III
AIR OPERATIONS IN EGYPT, DARFUR, AND
PALESTINE, 1914-17

The Turkish Attack on the Suez Canal, 1915

[Map, p. 161]

WHEN Great Britain declared war on Turkey on the 5th of November 1914, steps had at once to be taken to safeguard the Suez Canal. The defences were organized in three sections with their head-quarters at Suez, Ismailia, and Qantara, and the initial defence arrangements were completed by the 5th of December 1914. Towards the end of the year the Sinai Peninsula was swept by heavy rainstorms which filled the wells and pools of the desert, bringing to the Turk the gift of water: his plans for an early attack on the Canal were thereby greatly helped.

Air reconnaissances of the Turkish bases and lines of communication to give warning of the enemy intentions would, it was recognized, be essential and, on the 4th of November 1914, the day before war was formally declared on Turkey, a Flight of aeroplanes had been dispatched from England. This Flight, under Captain S. D. Massy, who had from the end of 1913 been in command of the Indian Flying School at Sitapur, arrived at Alexandria on the 17th of November with three Maurice Farman pusher aeroplanes. Two Henri Farmans, old but in flying condition, were also acquired from an Italian firm in Cairo. A site for an aerodrome was chosen at Ismailia, centrally situated for flying over the whole canal zone, and Cairo contractors were given orders to erect sheds to house the aeroplanes. The first reconnaissance flight was made on the 27th of November 1914, and thereafter the area east of the canal defence zone to a depth of about forty-five miles was under frequent surveillance. In December reinforcements of an engineer and mechanics for the Ismailia Flight arrived from the Indian Flying School, Sitapur, bringing with them a B.E.2a and two Maurice Farman aeroplanes, all three

without engines, and from England came three pilots with two Renault engines and miscellaneous stores. Subsidiary landing-grounds were established and stocked with petrol and oil in order that aeroplanes from Ismailia might replenish their supplies when engaged on long reconnaissances.¹

The area that could be covered by the aeroplanes was limited, but Lieutenant-General Sir John G. Maxwell, the Commander-in-Chief, had also at his disposal seven French seaplanes which, operating from ships off the coast of Sinai, could reach places outside the range of the aeroplanes. These seaplanes—80 horse-power Nieuports—under the command of Lieutenant de Vaisseau de l'Escaille, made many fine flights far inland over the Turkish military area. The pilots were French and the observers British, and their reports, which for fullness and accuracy compare well with any among official records, gave much information of military value. The seaplanes were flown chiefly from the *Aenne Rickmers* (later called *Anne*), a former German cargo vessel which had been re-equipped as an aircraft carrier, but they also operated, from time to time, from the *Rabenfels*, also a former German cargo boat (later called *Raven II*), and from the light cruiser *Doris*.²

Seaplane reconnaissances in December 1914, and in the first few days of January 1915, revealed increasing concentrations of Turkish troops at Beersheba and in its neighbourhood, and this information from the air, coupled with what was reported by agents, led the British command to conclude that the expected Turkish attack on the Canal would not be long delayed. To take the edge off the excitement in Egypt it was thought advisable, on the 11th of January 1915, to issue a statement to the Egyptian press that an attack was imminent. Subsequent air reconnaissances showed the enemy on the move and revealed the direction of his advance. Armies which had

¹ The landing-grounds were at Qantara Post; Suez; Mabeiuk 15 miles east of Suez; Ras el Hagg 35 miles east of Suez; Er Rigum (Zohra); and Qatiya.

² The work of the seaplane detachment is recounted in *On se bat sur mer* by Paul Chack.

of old set their faces towards Egypt from Palestine had always followed the coast. There was no historical precedent for an invasion across the desert of Sinai, but the road through El Arish, which had so often known the tread of the invader, was within range of the guns of the Allied warships and, with aircraft available to direct the fire, the way of the Turkish troops could be made too hazardous. The route from Ma'an (through Nekhl to Suez) was also threatened by warships from off Aqaba. The enemy, therefore, helped by the abnormal rains which made water available in the pools, decided to move his main body across the desert.¹

The Turkish plan, so far as it can be elucidated, was to get command of a part of the Suez Canal for long enough to allow of ships to be sunk and such other action to be taken as might close the Canal permanently.² The main body marched from Beersheba through El Auja and Bir el Jifjafa on Ismailia, with subsidiary columns moving by El Arish on Qantara, and through Nekhl against Suez: the object of the flank detachments was to keep the British command in doubt about the main point of attack.

Up to the middle of January 1915 the aeroplane observers who reconnoitred the desert immediately east of the Canal had little to report, but on the 17th of January the Turkish northern flanking column was discovered at Bir el Abd. Next day a seaplane observer from the *Aenne Rickmers* reported indications that there had been westerly movements from Beersheba. He found an important camp north of the Gebel Dhalfa with a well-defined track between the camp and El Auja, and he concluded that much traffic had recently passed between the two places. He went on to El Auja and found about 3,000 troops there. On the 19th the same observer was over Beersheba and he discovered some 10,000 troops in the neighbourhood, including 2,000 who were arriving from Hebron in the north-east. He inspected part of the

¹ A water supply, transported by 5,000 camels, was also organized by a German officer.

² See *Military Operations, Egypt and Palestine* (MacMunn and Falls), Vol. I, pp. 34-6.

track to El Auja, and although no troops were visible he was certain that the track had been well used. On the 23rd of January the main enemy column was seen from the air at Moiya Harab, where it had arrived from Bir el Jifjafa. Two days later another column was reported from the air near Bir el Mahadat, north-east of Ismailia, and on the same day the southerly flanking column was found at Mabeiuik, east of Suez. Bombs of twenty-pound weight were carried on the reconnaissance aircraft and dropped from time to time on the Turkish troops. The enemy admits that at first the bombing caused panic among the men, but claims that they soon got used to it. This may be accepted because the dropping of bombs was merely incidental and, in any event, the light-weight missiles which were employed cannot be reckoned as effective weapons when aimed at troops in the open on a sandy soil.

By the end of January it was clear from the air reports that the main enemy attack might come at any moment, and that it would be made on the British centre about Ismailia. On the 1st of February it was reported from the air that the Turks opposite Ismailia were advancing, and reinforcements were therefore moved to the bridge-head defences. Next morning enemy parties made contact with British outposts, and there was desultory fighting throughout the day until, by the evening, touch had been effected along a twenty-five mile front from Deversoir to El Ferdan. In the early hours of the 3rd of February, by moonlight, the first attempt to cross the Canal began. Shadowy masses, bearing loads, were seen approaching the British positions south of Lake Timsah. By the time the attempt was fully under way, groups of men, carrying pontoons and rafts, were advancing against a mile and a half of canal frontage. They were met with rifle and machine-gun fire and, as a result, most of the pontoons and rafts were abandoned short of the water's edge. The climax of the Turkish invasion, so long and elaborately organized, was the passage across the Suez Canal of three pontoons whose occupants were killed or taken prisoner.

That this was to be the climax was not guessed at the time. At dawn there was an infantry assault, supported

by field artillery, on the British positions, but the attack was repulsed and the defence then awaited the next effort which, it was assumed, would not be long delayed. There was, however, no second attack. Aeroplane reports from the 4th of February onwards told the unexpected news that the Turks were evacuating their positions and camps and, by the 10th, the eastward withdrawal into the desert was observed to be in full movement. There was some spasmodic bombing of the retreating enemy troops, but nothing important could be achieved because few aeroplanes were available.

Seaplane reconnaissances of the distant Turkish communications were infrequent during February owing to rough seas and poor visibility. On the 7th of February a seaplane reached Beersheba and the observer had noted about 20,000 men in and around the town, thus confirming reports, received by head-quarters in Egypt, that the Turks had been reinforced. For a fortnight no further air reconnaissance of Beersheba was possible, and Sir John Maxwell was without news of what the enemy concentration was doing. He had been warned by Lord Kitchener, the Secretary of State for War, not to risk a reverse, and, in view of the uncertainties of the situation, and because his forces were comparatively weak, he had decided not to follow the Turkish retreat into the desert. On the 21st a seaplane observer who got through to Beersheba reported about 35,000 troops in the neighbourhood, and, next day, aeroplane observers from Ismailia told of new camps at Nekhl and at Bir el Hassana. Sir John Maxwell concluded that another attack on the Canal might be expected later, but no such attack was made. The Turks were soon fully occupied elsewhere in a desperate defence of the Gallipoli Peninsula.

The Gallipoli campaign also led to the withdrawal of the greater part of the British troops from Egypt. The Royal Flying Corps detachment, however, remained at Ismailia, and the pilots and observers settled down to a series of routine reconnaissances into the desert east of the Canal. Three of the French seaplanes aboard the *Aenne Rickmers* were sent to the Gulf of Smyrna at the beginning of

March.¹ The two remaining serviceable seaplanes continued to operate, from the *Rabenfels*, from off the coast of Palestine. By April they had been reinforced by three additional French seaplanes, enough to ensure a limited number of strategical reconnaissances.

On the 29th of April there was a clash between a patrol of 100 men of the Bikanir Camel Corps and a mixed body of about 250 Turks and Bedouin. The enemy troops were discovered by two reconnoitring Maurice Farmans at dusk on the 28th at El Hawawish, thirteen miles east of the Canal. On the air information the Camel Corps patrol was ordered to attack the enemy encampment during the night, but before the patrol reached El Hawawish the enemy had broken camp. The Turks and Bedouin made an attack on Bench Mark Post and then retired to Bir el Mahadat, where they were found next morning by an observer in a Maurice Farman. A message giving the information was dropped from the air on British cavalry near El Hawawish and, as a result, the enemy rearguard was brought to action; the enemy losses were thirty killed and twelve men taken prisoners. There were other skirmishes of a similar kind but, apart from these, the Sinai front was quiet for the remainder of the year.

In November 1915 the Fifth Wing, under the command of Lieutenant-Colonel W. G. H. Salmond, arrived in Egypt from England to take over responsibility for all aeroplane co-operation. The Wing was made up of Nos. 14 and 17 Squadrons and 'X' Aircraft Park.² The Wing head-quarters and the squadrons were concentrated at Heliopolis, where an aerodrome was made, while 'X' Aircraft Park took over a former Swiss iron foundry at Abbassia, between Heliopolis and Cairo. 'A' Flight of No. 14 Squadron was sent, on the 23rd of November, to take the place of the original detachment at Ismailia,

¹ On the 11th of March the *Aenne Rickmers*, while operating in the Gulf of Smyrna, was torpedoed by the *Demir Hissar*. The carrier was taken to Mudros and there patched up. She returned later to Port Said.

² No. 14 Squadron arrived with the Wing head-quarters and the Park on the 19th of November. No. 17 Squadron did not disembark, at Alexandria, until the 11th of December.

which, since the 24th of March 1915, had been known as No. 30 Squadron. The detachment had left Ismailia in October for Mesopotamia, where it joined two Flights which were already operating in that country as part of No. 30 Squadron.

The Western Desert

[Map, p. 190]

The threat to the Canal had been warded off for the time being, but on the western borders, where Egypt was vulnerable to attack from the desert, there was cause for anxiety. On the 14th of November 1914 the Sultan of Turkey, in his capacity of Khalif, had proclaimed a *Jihad*, or Holy War, on all those making war on Turkey or her allies. In the western desert Sayed Ahmed, the Grand Senussi, a powerful leader who had for long been in conflict with the Italians in Tripoli, was drawn by his religious sentiments into sympathy with Turkey. He was, throughout 1915, in close touch with German and Turkish agents and his growing hostility culminated in November 1915 in a series of hostile acts by his followers against British posts on the coast and in the desert. The British command in Egypt had, in spite of much provocation, pursued a friendly policy towards the Senussi, but by November 1915 it was recognized that a state of war more or less existed and, on the 26th, war on the Senussi was formally declared. The British posts in the coastal area west of Matruh were at once withdrawn and it was decided to concentrate a mixed force, called the Western Frontier Force, at Matruh. A detachment from 'A' Flight of No. 14 Squadron, with two B.E.2c aeroplanes (90 horse-power Royal Aircraft Factory engines), was ordered to join this force. The detachment detrained at the railhead at Dabaa, seventy-five miles east of Matruh. The aeroplanes were there erected and were afterwards flown to Matruh, whence the first reconnaissance was made on the 5th of December. This and subsequent reconnoissances gave useful information about the strength and disposition of the Senussi and Bedouin forces, and the

air observers also made sketches of the enemy positions. The strength of the enemy forces, chiefly concentrated at Wadi Majid south-west of Matruh, was estimated to be about 5,000. It was decided to surprise this force by making a night march from Matruh, and early on Christmas Day 1915 the Western Frontier Force, about 3,000 strong, moved against the enemy. Three days earlier, one of the air observers had made, from over Wadi Majid, a careful sketch of the enemy positions, and copies of the sketch were used by the attacking commanders. The attack was supported by the British sloop *Clematis* which, with the help of aeroplane observation, dropped shells in the Senussi camp at a range of 10,000 yards. The enemy was routed. The main body fled westwards, leaving 373 dead and quantities of ammunition and stores. Meanwhile, the advance of a British enveloping cavalry column had been delayed by enemy mounted troops, and this delay enabled the main body of the Senussi to escape. Had this not happened the campaign might have terminated forthwith.

The concentration south-west of Matruh had been dispersed, but another was reported near Bir Gerawla, twelve miles south-east of Matruh, where large numbers of Bedouin had assembled. Their camp was reconnoitred and sketched from the air on the 28th of December and, on the same day, a British column left Matruh to attack. On arrival they found that the camp had been hurriedly deserted and that cattle and stores had been abandoned.

Meanwhile two other air detachments were keeping watch for signs of Senussi activity. One, from No. 14 Squadron, had been at El Gharaq, Faiyum, from the 8th of December 1915, to reconnoitre the approaches from the Bahariya oasis, and the other, from No. 17 Squadron, had gone to El Hammam, south-west of Alexandria, on the 18th of December, to keep the Moghara oasis under observation.

In January 1916 the operations against the Senussi in the coastal area were continued. On the 19th an aeroplane observer discovered the main enemy camp at Halazin, twenty-two miles south-west of Matruh, where

there were 300 tents, including, as the observer noted, those of the Grand Senussi himself. The British column was thereupon sent out from Matruh on the 22nd and it came into action with the Senussi next morning. After a sharp fight, lasting most of the day, in which the enemy fought skilfully and with determination, the main body once again escaped. The British losses were 312 (twenty-one killed) while those of the Senussi were estimated by prisoners at 200 killed and 500 wounded. Air reconnaissances on the 24th of January revealed that the enemy had retired to a camp at Bir Tuta on the route towards Barrani.

Sir John Maxwell decided to occupy Sollum. The seaplane carrier *Ben-my-Chree* was sent from Port Said early in February to co-operate in the movement, and on the 11th seaplane reconnaissances were made of Sollum and Barrani. On the 15th, reconnaissances by the Royal Flying Corps showed that the Senussi had taken up a position at Agagiya, covering Barrani, where they were attacked on the 26th. In this action, in which a charge by the Dorset Yeomanry had decisive effect, the Senussi were heavily defeated and Ja'far Pasha, the Turkish commander, was captured. The Senussi never again stood to meet a British attack. Barrani was occupied without opposition on the 28th of February, and preparations (especially of a water supply) for the further advance on Sollum were made. For reconnaissance of the country between Barrani and Sollum, two aeroplanes were sent from Matruh to Barrani on the 2nd of March. At the same time the aeroplanes on detachment at El Hammam were transferred to Matruh, following to Barrani on the 8th, by which date the concentration of the British at Barrani was complete. The advance on Sollum was made chiefly by way of the inland plateau approached by passes through the escarpments. Air reconnaissances revealed small camps near the escarpments, but no signs that the passes would be defended. The difficulties and gradients of the main passes as they appeared from the air were reported in some detail. As the British approached Sollum on the 14th of March, the Senussi troops with-

drew from their main camp at Bir Waer, having first set fire to their stores and ammunition, and they retreated along the road to Tobruk. In the afternoon Sollum was occupied without opposition, and the news that the Senussi were fleeing from Bir Waer was brought in by an air observer. Thereupon the former Royal Naval Air Service armoured cars,¹ under the command of Major the Duke of Westminster, were ordered to pursue the enemy, and, after a fine dash across the desert, found the main body of the Senussi at Bir Azziza and routed them, taking three guns, nine machine-guns, and a quarter of a million rounds of ammunition, without suffering any casualties. This exploit was followed on the 17th by a spectacular dash into Tripoli to El Hakkim, 120 miles west of Sollum, to rescue ninety-one prisoners from the *Tara* and the *Moorina*.² The prisoners were found in a state of starvation and taken back to Sollum. The occupation of Sollum ended the campaign on the coast. The Aulad Ali, who had joined the Senussi, surrendered in large numbers, and unrest in Egypt began to diminish. A half Flight of two aeroplanes settled down at Sollum to regular reconnaissance of the routes into Tripoli, and to keep watch on reported German U-boat bases along the coast. The Barrani air detachment moved back to Matruh, whence routine reconnaissances were made along the coast and into the desert.

The detachment of No. 17 Squadron at Faiyum³ had discovered the arrival of Senussi forces in the Bahariya oasis on the 11th of February 1916. These threatened the Nile Valley in the Minya district and it was decided to send a British force to Minya and to include in the force a detachment of No. 17 Squadron in order that watch might be kept on the approaches to the Nile from Bahariya. On the 12th the Senussi camp in the oasis

¹ The armoured-car squadrons of the Royal Naval Air Service had been transferred to the Army in August 1915.

² The armed boarding steamer *Tara* and the transport *Moorina* had been torpedoed by German submarines in November 1915, and their survivors landed and handed over to the Senussi.

³ No. 14 Squadron's detachment at Faiyum had changed stations with No. 17 Squadron's detachment at El Hammam on the 10th of February.

was bombed (eight 20-lb. bombs) by a pilot from Faiyum, and when the camp was again reconnoitred three days later it was found that the enemy had disappeared. What the Senussi had done was to scatter among the local inhabitants to avoid further bombing by the Royal Flying Corps, but the inference drawn from the air report at the time was that the enemy troops had fled. The staff thereupon wished to learn whether the Senussi had retreated to Siwa, whence they had come, or whether they had taken the southerly route by way of the Farafra oasis to Lower Egypt. The latter oasis was reconnoitred on the 1st of March, and reported clear, after a six-hour flight by Captain Lord George Wellesley who used an advanced landing-ground about fifty miles south-west of Minya. Although the Farafra oasis was unoccupied when Captain Lord Wellesley appeared over it, it had, just previously, offered cover to another Senussi detachment which had moved on to Dakhla, where it had been reported by police agents on the 27th of February. In order that Dakhla might be kept under observation, the Minya air detachment moved to Asyut and proceeded to establish advanced landing-grounds from which the Kharga oasis, as well as Dakhla, could be watched. Many reconnaissances were subsequently made and some of them took their pilots to a maximum distance of 225 miles from Asyut, a striking example of the value of aeroplanes in a country tedious or impossible for other forms of reconnaissance.

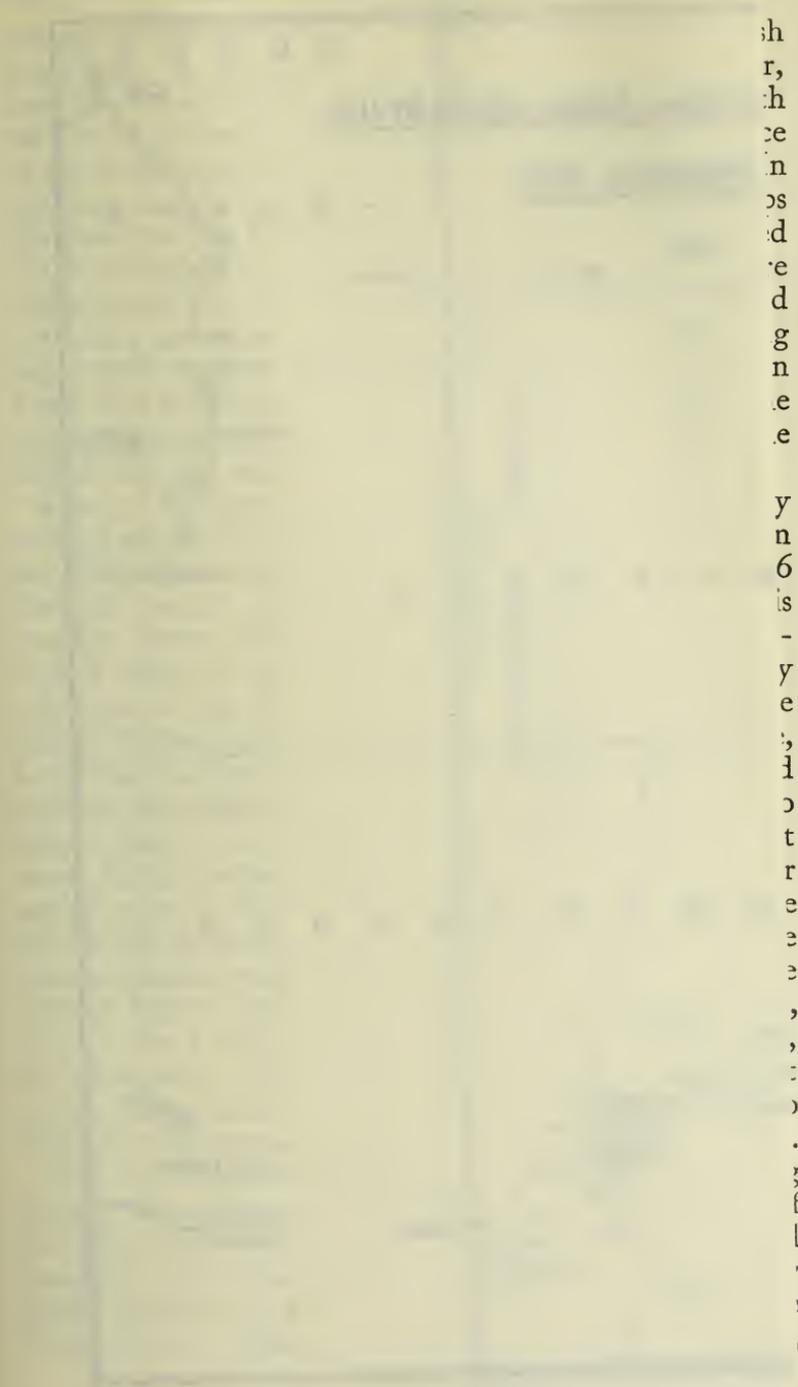
The Darfur Operations

[Map, p. 171]

The safety of Egypt was menaced not only by the Senussi. The desert operations were co-ordinated with a projected attack on the Sudan by Ali Dinar, Sultan of Darfur. This ruler had, with some thousands of his countrymen, slipped quietly away from the Khalifa's army just before Kitchener's victory at Omdurman, and had eventually reached Darfur, where he had been recognized as Sultan in 1899. Up to the outbreak of war in 1914, Ali Dinar had been left to go his own way,

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E G Y P T

Operations against the Sultan of DARFUR.

March - December, 1916.

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D A R F U R K O R D O F A N



but he was looked upon as fairly loyal to his British neighbours in the Sudan. With the coming of war, however, he was influenced by his religious affinities with the Grand Senussi in the north, and his qualified allegiance to the Sudan Government was ultimately undermined. In the same week in February 1916 in which the Senussi troops advanced on the Bahariya oasis, whence they threatened the Nile Valley, the forces of the Sultan of Darfur were concentrated on the Sudan frontier. Ali Dinar had previously announced his change of heart in an insulting letter to Sir Reginald Wingate, the Sirdar of the Egyptian Army and Governor-General of the Sudan, in which he told of his intention to invade Kordofan and to drive the British into the sea.

General Wingate had replied briefly but ceremoniously that he would be in Ali Dinar's capital before Ali was in his, and when it became clear at the beginning of 1916 that the Sultan of Darfur was about to carry out his invasion threat, General Wingate proceeded to concentrate a force of about 2,000 men at En Nahud, ninety miles east of the frontier of Darfur. In March 1916 he visited Nahud and ordered the commander of the force, Lieutenant-Colonel P. V. Kelly, to cross the frontier and capture the wells of Um Shanga and Jebel el Hilla. So long as these wells, which contained the only permanent water supply between Nahud and El Fasher, the Darfur capital, were in the hands of Ali Dinar, so long could he raid Sudan territory at his will, fortified by the knowledge that retaliation would be difficult or impossible. On the 16th of March 1916 the Nahud column moved forward, and by the 21st had taken, with only slight opposition, the two wells. The Darfur army, consisting of about 5,000 riflemen with spear-armed auxiliaries, moved back to El Fasher and preparations to attack it there were begun.

General Wingate was anxious to include in his attacking force a detachment of aeroplanes, not only because of the help they would afford him by reconnoitring and bombing Ali Dinar's positions, but also because they would provide a symbol of the might and power of the British Army. The sudden appearance, out of the blue,

of flying chariots such as no one in Darfur had seen before was calculated to impress on Ali Dinar's followers the futility of resistance.

The difficulties in the way of the organization of an air detachment were very great. It was anticipated that the attack on El Fasher would begin in May, and the aeroplanes would have to operate in May and June, the hottest months of the year in that part of the world, when temperatures of 120° in the shade must be expected. There would be frequent *haboubs*, or sandstorms, rising almost without warning and drawing a dark and gritty curtain across the sky to a height of 2,000 feet. The rainy season, which would begin about the middle of June, would bring torrential storms, but there would be earlier heralds of wind and rain. The country, of scrub, sand, and thorn jungle, was featureless, the existing maps were known to be inaccurate, and pilots would have great difficulty in finding their way about. Nor was there much hope of their survival if they lost direction. The nearest aeroplanes and personnel conveniently available were those of 'C' Flight of No. 17 Squadron at Suez,¹ and they would have to be sent by way of Port Sudan, a sea journey of 800 miles lasting four days, thence by rail for about 900 miles to the railway at El Obeid or Er Rahad (six days), where they would still be some 350 miles from the front. Camel and motor transport over the last part of the route, and a chain of small depots, would have to be organized, and there would be many score of minor problems associated with the effective maintenance of a technical detachment. Furthermore, time was pressing and there would be no more than a few weeks in which to make all the arrangements.

The many difficulties were met and overcome by model staff work, by the willing co-operation, at all stages, of the Sudan military authorities, and by the spirit and adaptability of the Royal Flying Corps officers and mechanics. Chief credit for the successful organization must go to Major P. R. C. Groves, senior staff officer of the Royal Flying Corps head-quarters staff in Egypt, who

¹ Suez aerodrome had been opened by the Flight in February 1916.

was in charge of the operation. This officer, accompanied by Captain E. J. Bannatyne who was to command the detached Flight, went on in advance to Khartoum. They arrived on the 5th of April and learned from the military staff that Lieutenant-Colonel Kelly's force was advancing on Abiad Wells, where it would be concentrated for an attack on El Fasher to take place about the middle of May. After making himself acquainted with the position in Kordofan and Darfur, and after setting on foot various preliminary arrangements, Major Groves went forward to the field of operations.

Meanwhile an advanced party of No. 17 Squadron, made up of three officers and fifteen men, with three lorries, a tender and trailer, carrying petrol, oil, hangars, tents, paraffin, bombs and other stores, had left Suez on the 7th of April. On the 20th the main air detachment of six officers and forty-one men, with four B.E.2c aeroplanes in cases, and additional stores, followed. The military railhead was at El Obeid, but Rahad was chosen for the Royal Flying Corps because it happened to possess a locomotive hut big enough to house two aeroplanes. By the 2nd of May the first aeroplane had been erected in the shed at Rahad and had been given a test flight.

Under the energetic direction of Major Groves, lines of communication to the Darfur front, depots, and landing-grounds, were being established. With a small motor convoy, loaded with selected stores, and guided by a native, Major Groves had left Rahad on the 29th of April for Nahud. The two 3-ton Leyland lorries with the convoy repeatedly sank to their axles in the sand and had to be hauled and pushed out again by the sweating personnel. The journey, made without rest between dawn and dark, took six days. At Nahud the main field base for the air detachment was established with shed accommodation for the four aeroplanes. The material to build the sheds, wood and corrugated iron, was supplied by the Sudan Public Works Department and transported to Nahud by hundreds of camels. Transport forward to the front from Nahud was by camel. An advanced base at Jebel el Hilla, 110 miles from Nahud and about 290 miles from Rahad, was

set up, the two Royal Aircraft Factory tents, or hangars, to house the aeroplanes being sent forward, with difficulty, packed on fifty-six camels. Some of the camels pushed their heads through the triangular sections of framework of the hangars, carried in pairs on their sides, and they presented a series of amusing pictures. Seventy miles beyond Jebel el Hilla, at Abiad Wells, an advanced landing-ground with one tent was opened. Intermediate landing-grounds were also cleared and marked out at four places other than those already named between the railhead at Rahad and Abiad Wells. Along the whole route large cloth arrows, as a guide to the pilots from the air, were laid out at intervals of about thirty miles. Arrangements were made to draw the attention of pilots to the directional arrows by means of fires. Local officials, sheikhs, marmurs, &c., were given the duty of lighting the fires on receipt of a warning that aeroplanes would be passing over: they were to keep the fires going until the aeroplane was seen to pass.

Apart from these major arrangements, many minor, but not unimportant, details had to be considered. Sun screens to protect the aeroplanes on the advanced landing-grounds were designed, and special propeller screens were made. The men were supplied with leggings, back pads, mosquito nets, and tinted glasses, while the general stores included insect poisons, well buckets, and *fantasses*¹ for holding water. As illustrating one of the difficulties of the operation it may be mentioned that the loss of petrol through evaporation was high. Although the petrol tins were kept wrapped in grass matting the average loss was fifty per cent.

By the 11th of May two of the four aeroplanes had been flown to the advanced landing-ground at Jebel el Hilla and the remaining two to the base at Nahud, where they were held in reserve. The first reconnaissance of El Fasher was made on the 12th of May by Lieutenant F. Bellamy, and the unexpected appearance of the aeroplane had a tonic effect on the Sudanese, Egyptians, and Arabs who

¹ *Fantasse*, an Arabic word adopted by the army. It was a small iron tank of 16 gallons capacity: each camel carried two.

made up Lieutenant-Colonel Kelly's force.¹ The pilot landed at Abiad Wells and made a personal report of what he had seen to the commander. Air reconnaissances of El Fasher and its neighbourhood were maintained and many propaganda leaflets were dropped. These were of two kinds. It was known that Ali Dinar had been warned by agents that the invaders of his territory intended to force the Christian religion on his people. It was essential that this false rumour should be denied because otherwise Ali Dinar might be tempted to destroy the wells in the line of the British advance. Although this, as an act of war, was forbidden by the Koran, there was no knowing what Ali Dinar might do if his fanaticism was fanned by a belief that an alien religion was to be forced upon his people. An emphatic denial of the rumour was therefore printed on small green handbills (the green of the Prophet), which were dropped by the aeroplanes. Other leaflets gave the information that aeroplanes would be dropping bombs and expressed a hope that the old, the young, and the women, would withdraw to a safe distance. Ali Dinar, in answer to these leaflets, contrived to get a message back in which he said: 'He did not care what the Sirdar's 'iron horses, that flew in the air, did.'

On the 15th and 16th of May the British moved forward in two columns to attack. Their first objective was Bir Melit, sixty-eight miles from Abiad. It was believed that water was available at Bir Melit and the Royal Flying Corps was asked to reconnoitre the place and report on this point, an important one which conditioned the further advance. The reconnaissance was made on the 17th by Captain Bannatyne, who spent a total of nine hours in the air on this day. When over Melit, the propeller of the B.E.2c was hit by a bullet. Captain Bannatyne, however, attacked the enemy troops with his

¹ 'For the first time astonished troops saw the beautiful sight of an 'aeroplane gleaming against a golden sunrise as it turned in a downward 'circle to land on the prepared stretch of ground. "The ship of the air" 'brought down the house. "By God! our General is very clever," murmured the marvelling soldiery. . . .' Major A. J. Pott in *People of the Book*, p. 163, which contains an authentic account of the Darfur operations.

machine-gun and he also dropped 20-lb. Hales bombs on them. They fled, leaving the way open to the British. The pilot dropped a message giving this information and telling also of the presence of water. As a result Melit was occupied in force next day.

On the 22nd of May the advance was continued and there ensued a pitched battle at Beringiya, in which the Sultan's forces were defeated. Repeated sandstorms had made flying difficult for some days and air reconnaissances on the 22nd saw nothing. On the morning of the 23rd, however, when the Western Frontier Force was advancing on El Fasher, the enemy rearguard of Baggara horsemen was attacked with Lewis gun-fire by Second Lieutenant J. C. Slessor, who immediately afterwards came upon the remnants of the Dervish army, amounting to about 3,000, rallying round Ali Dinar's banner in and about the town. He at once attacked with bombs and caused the enemy to disperse in panic, and the Western Frontier Force entered El Fasher unopposed. Ali Dinar, who had expressed his contempt for the iron horses that flew in the air had a narrow escape. One of the bombs killed his camel just as he was getting ready to mount, and also killed two of his servants. Second Lieutenant Slessor was himself wounded in the thigh. This final attack from the air had a decisive effect. The morale of the enemy troops was destroyed by this unexpected form of assault and they broke into small parties, and later reports showed that many died of thirst in the desert because they could not bring themselves to return to El Fasher, where they might again be attacked from the air. All danger to the Sudan from the Sultan of Darfur was at an end, but so long as the Sultan himself still remained at large he would be a thorn in the side of the British. He was, therefore, in due course, pursued by a small column and, on the 6th of November 1916, after an attack on his camp at Jebel Juba, Ali Dinar was found dead with a bullet through the head.

The small detachment of the Royal Flying Corps, at the end of a long camel line not far from Central Africa, had played a part in operations which had, with

little advertisement, added a territory nearly as large as France to the Empire. In the final pursuit of Ali Dinar the aeroplanes had not been employed. After the capture of El Fasher the air detachment had been ordered to return to Egypt, and it had eventually embarked at Port Sudan on the 21st of June 1916.

The Sinai Front

[Maps, pp. 161 and 181]

After the evacuation of the Gallipoli Peninsula in January 1916 Egypt took on a new importance. Considerable Turkish forces had been made available for operations against the Suez Canal and, therefore, to Egypt the British troops from the Dardanelles must be sent. The climatic conditions and the comparative quiet of the Sinai front would combine to restore the health of men who had suffered much from their privations at Gallipoli.

Meanwhile, it had been decided, in December 1915, that the defence of the Suez Canal on its own banks should be abandoned and that the line of resistance should be pushed out about 11,000 yards into the desert to free the canal zone from possible artillery fire. This reorganization of the defence system entailed elaborate preparations, and during the early part of 1916 the canal area was a scene of great activity.

The evacuation of Gallipoli and the new importance of Egypt led also to a reorganization of commands in the Mediterranean. Lieutenant-General Sir Archibald J. Murray, who had been Chief of the Imperial General Staff from September to December 1915, was appointed to the command of the Mediterranean Expeditionary Force with instructions to move his head-quarters from Mudros to Egypt to take control of the large forces assembling for the defence of the Suez Canal, leaving Sir John Maxwell in general command in Egypt with specific responsibility for the defence of the Western Frontier. This double control had disadvantages and, on the 10th of March 1916, Sir Archibald Murray was informed that the Government had decided to amalgamate

the two forces in Egypt under his command and that Sir John Maxwell would return to England.

New aerodromes, additional to Ismailia, were established on the canal front at Suez and Qantara. In February 1916 Lieutenant-Colonel W. G. H. Salmond moved the Fifth Wing head-quarters to Ismailia, where Sir Archibald Murray also had his head-quarters. In the same month the Suez aerodrome was occupied by a Flight (four aeroplanes) of No. 17 Squadron, and the Qantara aerodrome by a Flight of No. 14 Squadron. The Qantara Flight was made partly mobile with an establishment of eighty camels for petrol and oil transport, and with sand carts for dragging tents and spare engines. It is of interest that soon after his arrival at Ismailia, Lieutenant-Colonel Salmond began a course of lectures, on two days each week, for military officers, to whom he explained the organization of the Royal Flying Corps and its methods of co-operation with other arms. The talks helped to create a spirit of understanding and sympathy from the beginning, and it may be said that the liaison between the Royal Flying Corps and other arms in Egypt and Palestine was always close, cordial, and informed.

In the first three months of 1916 the main duties of the Royal Flying Corps detachments were reconnaissance and survey, with occasional bomb and machine-gun attacks on Turkish posts in the desert. The air photographic survey, the importance of which was stressed by Sir Archibald Murray, was on a large scale and was made in co-operation with the Topographical Section of the Intelligence Branch. Air photographs were taken of certain places already fixed by triangulation and the photographs were then transferred to the 1 : 20,000 squared map. With these maps, the air observers were able to give pin-point references which, owing to the featureless nature of the desert, would otherwise have been impossible.

The longest air reconnaissances in the early part of the year were weekly ones to Hassana and Nekhl about 100 miles east of the Canal. On these flights extra petrol tanks and, usually, bombs were carried in place of an observer. Twice in February the Turkish waterworks at

Hassana were damaged by a 100-lb. bomb. On the 24th of March the waterworks and camps in its neighbourhood were attacked by six B.E.2c pilots (without observers) with forty 20-lb bombs which hit tents and buildings, but missed the reservoir.

On the 11th of April a raid by mounted troops on Jifjafa in the central defence section was made to destroy a small Turkish force which had, for some time, been boring for wells. A Royal Flying Corps detachment with wireless-receiving equipment accompanied the column, and special air reconnaissances kept the officer in command informed of the situation ahead of him. The co-operation was successful, Jifjafa was surprised, the wells and boring plant were destroyed, and many prisoners, including an Austrian engineer, were captured.

In the middle of April the first German aeroplanes were seen over the Sinai front, a certain indication of its growing importance.¹ The arrival of German aircraft had been known on the 7th of March when two seaplanes from the aircraft carrier *Ben-my-Chree* had made a reconnaissance of Beersheba and the observers had found and photographed an aerodrome with six hangars near the town. The German air unit, which had come from Homburg, was the 300th Squadron, equipped with fourteen Rumpler (C.I) two-seater aeroplanes fitted with 150 horse-power Mercédès engines. The Rumplers were faster and had a better all-round performance than the B.E.2c of the Royal Flying Corps. Not long after its arrival the enemy squadron received a few Fokker single-seater fighters.

The German air service on the Palestine front thus began in the spring of 1916 with a technical superiority which it was allowed to retain until the autumn of the following year, when, for the first time in the campaign, a few superior British fighter aeroplanes (Bristol Fighters) were allotted to this front. It was not the German policy to relegate obsolete aeroplanes to subsidiary theatres of war. Although Germany had virtually to sustain the air

¹ Papers found on the Austrian engineer captured at Jifjafa on the 11th stated that aeroplanes would be flying over the Sinai front any time after the 8th of April.

war against the Allies on all fronts, she was usually able to allot to each the best contemporary type aeroplanes, even though few. In other words, she acted on the conviction that quality was more important than quantity. On the Palestine front the German air service, although outnumbered and handicapped by its long line of communications for supply and repair, was usually able, until October 1917, to do whatever was strictly necessary without effective interference from the Royal Flying Corps, and had, furthermore, the means to make difficult, at will, the work of the British pilots and observers.

The construction of a standard-gauge line from Qantara towards Qatiya had been begun on the 10th of March, and within four weeks sixteen miles of railway had been laid. That is to say, the railhead, early in April, had passed beyond the advanced line of the canal defences and it became necessary to establish protective posts in the Qatiya oasis, for which Brigadier-General E. A. Wiggin, 5th Mounted Brigade, was made responsible. During the first three weeks in April air reconnaissances indicated a westerly Turkish movement towards the Qatiya area. There was activity along the northerly coast road from Bir el Mazar, movement from that place to Bir el Abd, and a general growth in the number of men and camels at both places. On the 20th of April the westerly movement seemed to be developing. It was found on that day, by an air observer, that reinforcements had arrived at Bir el Abd, and the aeroplane was heavily fired on while the reconnaissance was being made. On the morning of the 22nd of April a reconnaissance report was brought in which added to the feeling of uneasiness at Royal Flying Corps head-quarters. The view held by Lieutenant-Colonel W. G. H. Salmond was that the security of the army against surprise was the responsibility of the Royal Flying Corps. When he pondered the air report on the 22nd, in conjunction with the reports of the previous weeks, and with other reports of German air activity which showed that enemy reconnoitring aeroplanes had, during the past days, given particular attention to the Qatiya district, he became

convinced that a Turkish attack on Qatiya was about to take place. The report which he had before him on the morning of the 22nd uncovered Turkish movements from a fresh direction. It showed that there were 200 men at Bir el Mageibra, and that well-defined tracks led from Bir el Mageibra to Bir Bayud, where 100 men and 30 camels were gathered at the well. The aeroplane had circled over Mageibra at 700 feet, but had been unmolested until, obviously at a given signal, heavy fire had been opened by the Turkish troops, an indication that they were a formed body of disciplined soldiers.

Lieutenant-Colonel Salmond, on the evening of the 22nd, made a special report at General Head-quarters, probably in person. The only written record of its contents is a note in a Royal Flying Corps diary which says that he stated his opinion that 'Qatiya would be attacked 'on the night of the 22nd/23rd of April, or on the morning 'of the 23rd, by a force estimated at 1,000 men and three 'guns'.

This warning was to receive speedy justification, although the strength of the attacking force was underestimated.¹ There is, however, no record in the appropriate military war diaries of Lieutenant-Colonel Salmond's report, nor is there evidence to show that action was taken to pass on the warning to the forward commanders. Had this been done it seems unlikely that the Turkish attack, which took place on the morning of the 23rd, could have met with the same success.

[Map, facing]

The Qatiya area came within No. 3 section of the canal defence zone commanded by Major-General H. A. Lawrence. On the 21st of April Brigadier-General E. A. Wiggin's 5th Mounted Brigade was disposed as follows: at Qatiya were the Worcestershire Yeomanry; at Bir el Hamisah were the Warwickshire Yeomanry, less one

¹ The total Turkish attacking strength, led by the German Colonel Kress von Kressenstein, was 95 officers, 3,560 other ranks, 6 guns and 4 machine-guns, with horses and camels. See *Military Operations, Egypt and Palestine* (MacMunn and Falls), Vol. I, p. 170.

squadron; and at Romani were Brigade head-quarters and the Gloucestershire Yeomanry. On the evening of the 21st of April one squadron of the Worcestershire Yeomanry moved into bivouacs at Oghratina to cover a Royal Engineer party which had orders to prepare wells as a preliminary to a further advance planned to be made against Bir el Abd. The second squadron of the Worcestershire Yeomanry joined the first at Oghratina on the afternoon of the 22nd and they were replaced at Qatiya by a squadron of the Gloucestershire Yeomanry pending the arrival of one regiment of the Anzac Mounted Division which had been ordered forward to reach Qatiya on the 24th.

Brigadier-General Wiggin had all the mounted troops at the disposal of Major-General Lawrence, and he had been instructed that, as two days must elapse before he could be reinforced with infantry, he was, in the event of a heavy attack, to manœuvre back upon Dueidar, or upon the railhead (at that time west of Romani), where he could be supported. It is possible that the mounted force could have retired as planned provided adequate warning of an attack was received, although the presence of dismounted troops at Oghratina and at Qatiya meant that a longer warning would be necessary than if mounted troops alone had been concerned. There were, however, British movements during the night of the 22nd/23rd which favoured the Turkish plans. The aeroplane reconnaissance report which had seemed to Lieutenant-Colonel Salmond, on the morning of the 22nd, to be a final link in the chain of evidence which pointed to an impending attack on Qatiya, was rather differently interpreted at 5th Mounted Brigade head-quarters. In the air report, which had been dropped at Qatiya by message bag (at 7.20 a.m.), it was stated that about 200 men together with camels were at Mageibra. On receipt of the message, Brigadier-General Wiggin had wired to head-quarters saying: 'If General Lawrence approves will go for them to-night or they will give me trouble.' Approval had been given by telegram sent off at 9.30 a.m.

Accordingly, shortly after midnight, Brigadier-General

Wiggin rode out from Hamisah with two squadrons of the Warwicks and one of the Worcesters to surprise the Mageibra camp. While the yeomanry were moving through the night, the Turks they sought to surprise were likewise active, but their march, on a more southerly track, was in the opposite direction, westwards towards Dueidar. In consequence, when the yeomanry arrived at Mageibra they found an empty camp, and after destroying it they rode back to Hamisah, which they reached, somewhat tired after their sixteen-mile journey, at 9 a.m. By this time the Turkish attack had already had appreciable success.

While Brigadier-General Wiggin had been away on his fruitless expedition, the detachment at Oghratina had been taken by surprise. Overwhelming numbers of the enemy, who made their approach under cover of a sea mist, had surrounded the yeomanry, had inflicted severe casualties upon them, and after taking the survivors prisoner (at 7.45 a.m.) had pushed on towards Qatiya. This post was attacked in force about 9.45 a.m., German air observers ranging Turkish guns on the camp. Attempts were made from Romani, and by Brigadier-General Wiggin from Hamisah, to relieve the Qatiya detachment, but they proved entirely vain, and about 3 p.m. the post was finally overwhelmed.

The Dueidar post, held by a detachment of the 5th Royal Scots Fusiliers, had been attacked by great numbers of Turks about 5.20 a.m., but the attack had been repulsed. An air observer over the Dueidar area after the mist had cleared, dropped a message at 8.26 a.m. to say that the main body of the column which had assaulted Dueidar was in retreat. The retreating column was attacked from the air with bomb and machine-gun fire¹ and was subsequently pursued by the 5th Australian Light Horse who had arrived from Qantara about 1 p.m.

Air reconnaissances on the 24th reported that the Turks

¹ Fifth Wing head-quarters, soon after its arrival in Egypt, had realized that air attacks against troops and camels had great possibilities and had arranged for aeroplanes to be fitted with machine-guns which could fire downwards from the side of the fuselage.

had withdrawn from Qatiya, and revealed also the line of retreat. Bombing attacks were made next day on the Turkish camps at Bir el Abd (seventy 20-lb. bombs) and at Bir Bayud (twenty-six 20-lb. bombs). During the three days of the affair at Qatiya, that is, on the 23rd, 24th, and 25th, the two Flights at Qantara and Ismailia, totalling eight aeroplanes, were in the air for sixty-eight hours and flew 4,000 miles. The explanation has been offered that the object of the Turkish attack was a reconnaissance in force to ascertain the progress of the railway line towards Qatiya, but this statement is difficult to understand in view of the fact that as much as, or more than, the fighting reconnaissance discovered was probably reported by German aeroplane observers who flew over the area. Furthermore, it is known that the Turks were well informed, through Bedouin who had access to the British outposts, of the British positions and almost certainly also of the progress of the railway. Be that as it may, tribute must be paid to the enemy for the skill and enterprise with which the action was conducted. Three and a half squadrons of yeomanry had been totally lost on the morning of the 23rd, and, although the general military effect of the Turkish attack was only to delay the progress of the railway for a few days, its moral value to the enemy was important and was duly exploited (in conjunction with news of the capture of Kut in Mesopotamia a few days later) to impress the mixed races in Sinai and Palestine.

In May the heat in Sinai became intense and, up to July, precluded any major ground operations. Air activity, however, was not lessened, more especially because the German squadron, operating mainly from an aerodrome at El Arish, was increasing its sphere of operations and was making occasional bombing attacks. By way of reply to two air raids on Port Said at the beginning of May, the town and aerodrome of El Arish were bombarded on the 18th. The aircraft carrier *Ben-my-Chree*, from Port Said, co-operated with the monitors *M.15* and *M.23* and with the sloop *Espiègle*. A Short seaplane was hoisted out about

4.30 a.m. and for fifty minutes the observer gave corrections by wireless of the fire of the two monitors on the aerodrome and on the enemy camps. Six Royal Flying Corps aeroplanes were timed to reach El Arish at 6 a.m. to bomb the camps and to fight any enemy pilots in the neighbourhood. The aeroplanes appeared to time, but found no enemy aircraft; the pilots dropped their forty 20-lb. bombs on the camps and on a marching column of about 1,000 men, among whom three bombs exploded. Photographs of El Arish were taken and a reconnaissance was made of the town and camps.

Port Said was again bombed by German pilots on the night of the 20th/21st of May and, in reply, four B.E.2c aeroplanes on the 22nd attacked five enemy camps with forty 20-lb. bombs. A new aerodrome, with a half-Flight of No. 14 Squadron, was established at Port Said as a result of the German air attacks on the town. In order that early warning of the approach of enemy aircraft might be received, the aerodrome was in touch by telephone and by wireless with the British garrison at Romani. On the 1st of June an enemy aeroplane, from about 8,000 feet, dropped eight bombs on the camp of the 1st Light Horse Brigade of the Anzac Mounted Division. The results of this attack are recorded and they show that one officer and seven men were killed and three officers and nineteen men wounded. In addition, thirty-six horses were killed and nine wounded, while the remainder stampeded. On the 11th an enemy aeroplane dropped eight bombs on Qantara and another attacked the British garrison at Romani with machine-gun fire. Lieutenant-Colonel W. G. H. Salmond planned an adequate reply which was made on the 18th of June, when eleven B.E.2c's from Qantara, approaching from the sea, attacked El Arish aerodrome from 600 feet. Two of the aeroplanes carried observers, but the others, so that a greater weight of bombs could be taken, were flown as single-seaters. According to the observation of the British pilots one German aeroplane on the ground was destroyed and another damaged, and two hangars were set on fire. In addition, one bomb of 20-lb. weight fell among a party of soldiers, and another of 100-lb.

weight exploded in the middle of a Turkish camp.¹ The British aeroplanes were subjected to heavy fire from the ground and three of them were brought down. From one which fell in the sea the pilot was rescued by a motor-boat. A second fell near the German aerodrome, but the pilot, Captain R. J. Tipton, set fire to his aeroplane before the Turks reached him. The pilot of the third, Captain H. A. Van Ryneveld,² was forced to land on the sea-shore, the sump in his aeroplane holed by a rifle bullet. He was seen by Lieutenant D. K. Paris, the observer in another B.E.2c, piloted by Captain S. Grant-Dalton, who went down and landed alongside, picked up Captain Van Ryneveld, and successfully carried his two passengers back to Qantara, a distance of ninety miles. For a month after the attack the enemy airmen were quiet and made only very occasional reconnaissance visits to the British outpost line. Meanwhile, to give early warning of German air activity to the British aerodromes, Royal Flying Corps wireless stations were set up at front-line posts in each of the four zones of the defences.

The Middle East Brigade

By June 1916, with the growth, actual and prospective, of the Royal Flying Corps units in the Middle East, it was decided to establish a central command in Egypt for the administration, organization, and maintenance of all Royal Flying Corps detachments in Egypt, Mesopotamia, East Africa, and, in due course, Salonika. Accordingly, on the 1st of July, the Middle East Brigade was formed, under Brigadier-General W. G. H. Salmond, with Lieutenant-Colonel P. R. C. Groves as his chief staff officer, to include: the Fifth Wing (Nos. 14 and 17 Squadrons,

¹ The only evidence, from the German side, is in Neumann's *Die Deutschen Luftstreitkräfte im Weltkriege* (pp. 520-1). The reference to this raid says: 'When our aerodrome was in process of construction, the English airmen carried out a very vigorous and daring raid. At 11 o'clock in the morning they dropped their bombs, and, having descended to within 100 feet from the ground, attacked us with machine-gun fire. However, they inflicted but little damage.'

² Colonel Sir H. A. Van Ryneveld. He flew from London to Capetown in 1920.

Royal Flying Corps, and No. 1 Australian Squadron),¹ the Twentieth Reserve Wing in process of formation (Nos. 21, 22, and 23 Reserve Squadrons), 'X' Aircraft Park, and 'X' Aircraft Depot, in Egypt; No. 30 Squadron and an Aircraft Park in Mesopotamia; and No. 26 (South African) Squadron with a section of an Aircraft Park in East Africa.

The Reserve Wing was being formed as a result of a War Office decision in April 1916 that a training organization should be built up in Egypt where the weather, especially in the winter, would enable flying instruction to proceed without appreciable interruption. The three reserve squadrons were sent from England and arrived in Egypt (Abu Qir) between June and September 1916. Not only were they to train pilots to meet the requirements of the Middle East Brigade, but they were also to act as a general training establishment for the Royal Flying Corps. The formation of 'X' Aircraft Depot, at Abu Qir on the 26th of July, was made necessary by the responsibility of the central command in Egypt for the supply of technical equipment and stores for all Royal Flying Corps squadrons in the Middle East.²

In June it had been decided to withdraw No. 17 Squadron from Egypt for service at Salonika, where an Allied advance was impending. No. 1 Australian Squadron took over the aeroplanes and aerodromes of No. 17 Squadron, the personnel of which were concentrated at Cairo. No. 17 Squadron left Egypt in transports for Salonika, by Flights, on the 2nd and 17th of July.

The great expansion in the air service in the Middle

¹ No. 1 Australian Squadron was (officially) renumbered No. 67 (Australian) Squadron, Royal Flying Corps, on the 12th of September 1916. The Army Council had suggested at the end of 1915 that the Dominions might care to raise complete squadrons for service with the Royal Flying Corps. Australia had accepted the proposal and the first squadron, No. 1 Australian Flying Corps, numbering 28 officers and 195 other ranks, but without aeroplanes or technical equipment, had embarked from Melbourne on the 16th of March 1916. The squadron reached Suez on the 14th of April and the men were distributed for training with the various Royal Flying Corps detachments. Most of the officers were sent to England for final training.

² For a review of the training organization, and of the supply and repair system, in Egypt, see Ch. VIII, pp. 449-58.

East will be made clear as this history progresses, but so that the reader may be aware of what manner of command the Middle East Brigade was, it will be necessary to anticipate a little. Most of the personnel required to satisfy the demands caused by the rapid expansion were obtained by combing through the armies in the four theatres of war, and it was not uncommon to find, in any squadron at any time, officers and men who had seen service, on the ground or in the air, in all theatres of the Middle East. This may seem an unimportant point, but it meant that many of the squadrons were representative of the whole Brigade, and this fact was responsible, in part, for the sense of unity which undoubtedly pervaded the Brigade. It became necessary to organize in Egypt training establishments, depots, and repair centres, which continued to expand to the end of the war. A small training class grew into a school of aerial gunnery; from another class there developed a school of military aeronautics, and separate schools came to be established for instruction in artillery co-operation and in bombing. A cadet wing was also formed in Egypt. The organization which was built up at Abu Qir, Abbassia, Heliopolis, Ismailia, Suez, Helwan, and Abu Sueir, called for the construction of temporary and semi-permanent accommodation on a large scale, and the Middle East Brigade came to have its own engineer works officer who directed a small army of native labourers. The aircraft depots at Abu Qir and Heliopolis were equipped to make any kind of repair to aircraft and engines, and 'crashes' of all kinds from the various theatres of war in the Middle East were sent to the depots to be rebuilt. As a result of the efficient training organization in Egypt, the Middle East Brigade came to be not only self-dependent, but it was able also to supply trained pupils for other theatres of war.

The Brigade head-quarters was called upon to improvise units for operations without guiding help from precedents. New tactics had to be developed to suit the changing conditions of mobile warfare in different theatres of war. The Brigade head-quarters constituted a clearing-house for ideas. The staff studied the operations in the various

theatres of war, and ideas which had been tried out with success in one were at once passed on to the others. The latest developments in aircraft co-operation with other arms in France and England were received in Egypt and were made the subject of cabled or written instructions to the squadrons of the Brigade. Personal visits to the various theatres were paid by Brigadier-General Salmond and by his staff officers, and these visits helped to keep squadrons abreast of the changing developments in Europe as well as in the Middle East. Although the campaigns in Egypt and Palestine, in Arabia, in Mesopotamia, Macedonia, and in East Africa, are narrated separately, the reader should remember that the air organization in each of these theatres took life and was sustained from a central source in Egypt.

With the formation of the Middle East Brigade on the 1st of July 1916, the command of the Fifth Wing was taken over by Lieutenant-Colonel P. B. Joubert de la Ferté with head-quarters at Ismailia. The disposition of the detachments of the Fifth Wing were as follows: *Ismailia*, Head-quarters and one Flight of No. 14 Squadron; *Qantara*, one Flight of No. 14; *Port Said*, detachment of No. 14; *Suez*, one Flight of No. 1 Australian Squadron; *Heliopolis*, Head-quarters and one Flight of No. 1 Australian Squadron and a half-Flight of No. 14; *Sollum*, half-Flight of No. 14; and *Kharga oasis*, one Flight of No. 1 Australian Squadron.

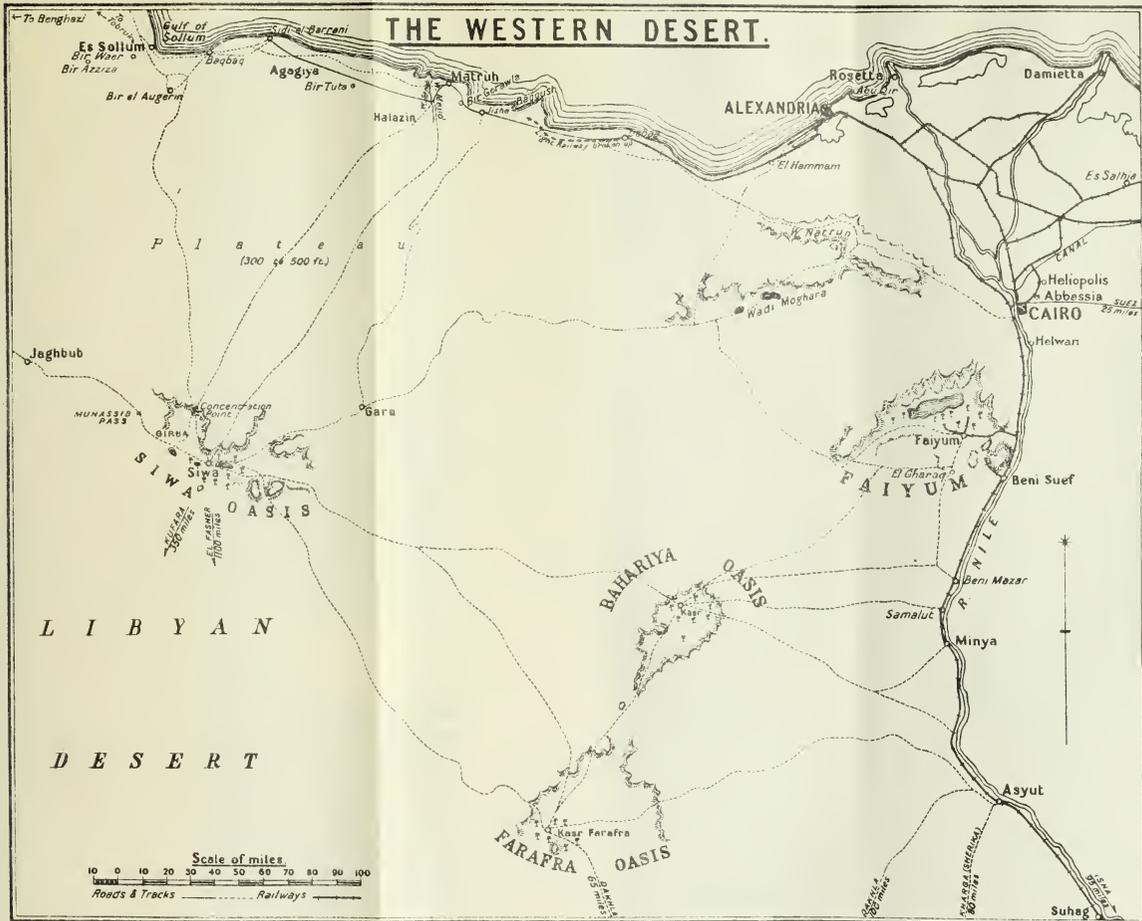
End of Western Desert Campaign

[Map, p. 190]

It will be seen that there had been changes in the dispositions of the units in the western desert. In the first week in May the air detachments had been withdrawn from Sollum and Matruh in the coast area, and from Faiyum, for work in the canal zone. At the end of May, however, rumours were circulated that German and Turkish troops had arrived at Benghazi, and a half-Flight of No. 14 Squadron was in consequence again sent to Sollum, where it remained for reconnaissance duties until the 25th of July when it was withdrawn to reinforce the canal

zone in anticipation of an impending Turkish attack on Romani.

In the southern desert the Senussi forces, discouraged by the defeat inflicted upon Sayed Ahmed on the coast, had evacuated the important Kharga oasis at the end of March 1916, and it had been reoccupied by the British on the 15th of April. The air detachment of No. 17 Squadron based at Asyut, which had been responsible for the reconnaissance of the Kharga and Dakhla oases, moved forward to Kharga (Sherika) on the 20th of April and afterwards worked in co-operation with patrols of Ford light cars, by which the Senussi detachments were deprived of communication with the Nile Valley. An episode may be quoted from the records of the Kharga detachment to illustrate the hazards of desert flying. On the 15th of June two B.E.2c aeroplanes left for an advanced landing-ground forty miles west of Kharga, from which they were to make a reconnaissance of the Dakhla oasis on the following day. Both pilots lost their bearings on the journey to the advanced ground and they eventually made a forced landing and settled for the night. When they came to leave next morning, the engine in one of the aeroplanes could not be made to start, and the pilot in the second aeroplane flew off to get help. When he returned on the morning of the 17th, there was no sign of the disabled B.E.2c. An intensive search was subsequently conducted by the Royal Flying Corps, by armoured cars, and by camelry, but it was not until the 20th that a patrol of the Imperial Camel Corps discovered the aeroplane with its occupants dead. From a diary left by the passenger, First Air Mechanic J. Garside, it appeared that the engine had been made to start, and the pilot had therefore set out to find his aerodrome. After a twenty-five minute flight, however, the engine had failed again and a landing had been made. Once more the engine had been made to work, but after another short journey it had given out finally. The pilot, Second Lieutenant S. G. Ridley, had died on the evening of the 18th, and Air Mechanic Garside on the 19th or 20th, both of them victims of the scorching desert.





It will be convenient here to look ahead and to summarize the remainder of the campaign on Egypt's western frontier. 'A' Flight of No. 1 Australian Squadron relieved the detachment of No. 17 Squadron, as we have seen, at Kharga (Sherika) on the 7th of July. The Australian Flight remained at Kharga until the 8th of November and made reconnaissance journeys—many of long duration—which covered the Bahariya oasis in the north (from a landing-ground near Minya) and the Dakhla oasis in the south. The Dakhla oasis was distant about 120 miles from Sherika, and a refuelling ground was established about fifty miles out, the fuel and oil being sent forward by camels which had to set out five days in advance of the time the reconnaissance was to be made.

In October the British moved out against the Senussi in the Bahariya and Dakhla oases, both of which were ultimately evacuated by the enemy. The Grand Senussi, Sayed Ahmed, retired with the remnants of his forces on Siwa, where they were attacked and defeated in February 1917. Sayed Ahmed was able to make his escape, but the defeat nevertheless was decisive. A treaty was concluded between the British and Ahmed's cousin, Sayed Idris, newly recognized as head of the Senussi Confraternity, and the western desert thereafter ceased to be a sphere of military operations. Sayed Ahmed remained in the desert, shorn of his influence, until August 1918, when he journeyed to Constantinople in an Austrian submarine.

The Battle of Romani

[Maps, pp. 161 and 193]

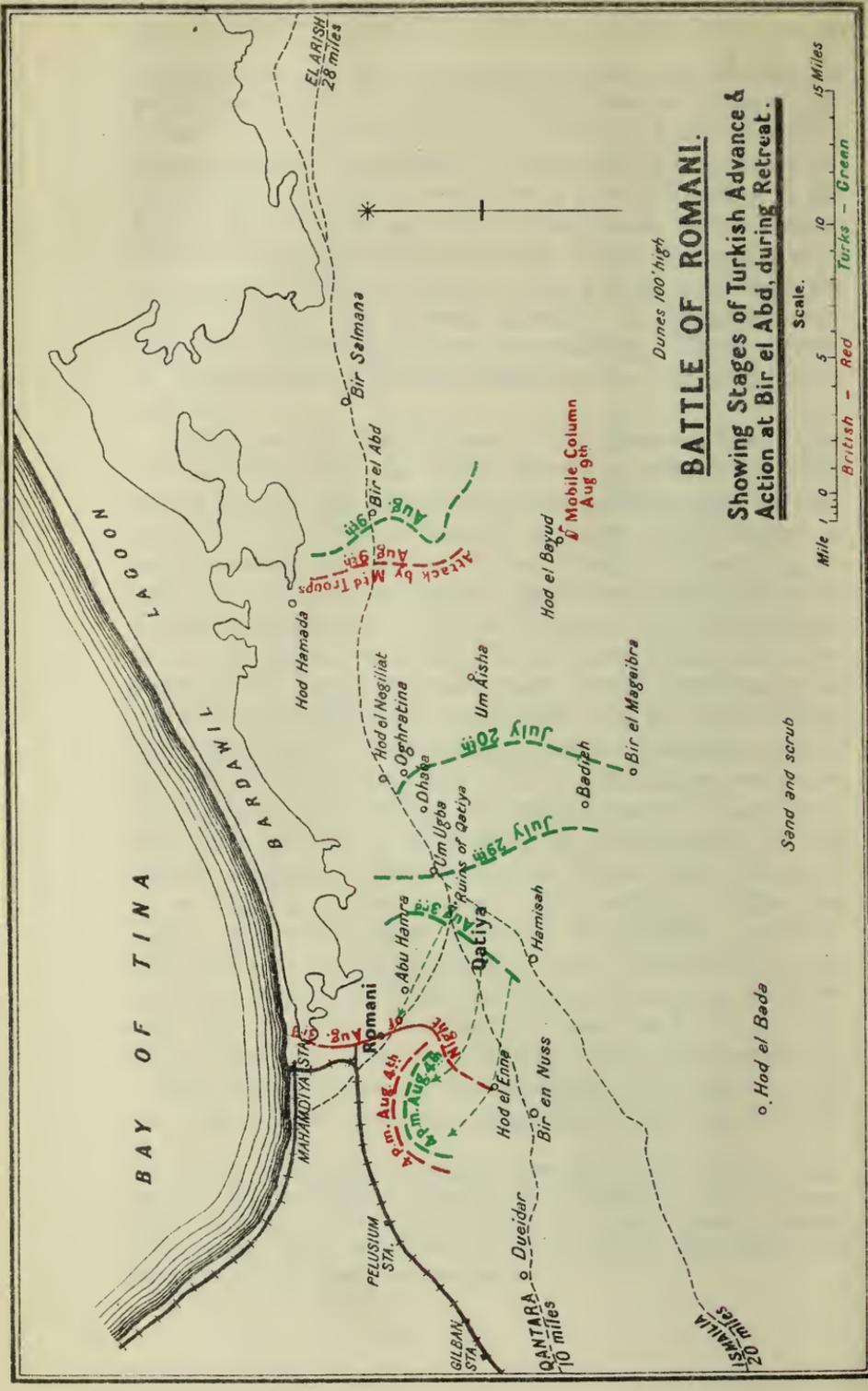
Towards the end of June air reconnaissances had reported an appreciable growth in the Turkish advanced camp at Bir el Mazar, forty-two miles east of Romani. In itself this increase was of no great significance, but about the same time agents began to come in with warnings of an intended Turkish advance down the main road on Qatiya. Subsequent air reconnaissances, therefore, kept special watch over the whole northern sector. Up to the 18th of July the observers had little that was unusual

to report and, as the campaigning season was already far gone, the British command in Egypt was inclining to the belief that the anticipated attack on the Canal would be postponed until the winter. On the 19th of July, however, the patience of the air service was rewarded when at Bir Bayud, Bir Gameil, and Bir el Abd, some 8,000 Turkish soldiers, plentifully supplied with camel transport, were discovered.¹ The air reports next day showed that the enemy troops had moved forward to Mageibra and Oghratina where they were entrenching. There seemed no doubt that the Turkish offensive was, after all, to be launched.

Acting on the instructions of the General Staff, who were anxious that the Turks should proceed with their attack against the British prepared positions and so conform with the British counter-strategy which aimed at envelopment, the Royal Flying Corps did nothing to harass the enemy advance, but simply reported the further Turkish preparations. The air observers told of reinforcements on the move along the northern roads, and they watched the rapid progress made in the fortification of the line from Oghratina southwards. On the 25th of July the beginnings of an advanced enemy aerodrome west of Bir el Abd were discovered. On the 28th there was a new development when three columns of enemy troops were seen from the air to be moving in the direction of the British outposts. They halted and were later observed to be digging a new advanced line which, at Hod um Ugba, was within five miles of the British positions. Movements of reinforcements in the Turkish back areas were reported on the 29th and again on the 30th, but after that day all major movements ceased and it was concluded that the enemy concentration had been completed.

The British command was puzzled at the time to find an explanation for the slowness with which the Turkish

¹ On this reconnaissance Brigadier-General E. W. C. Chaytor, commanding the New Zealand Mounted Rifles Brigade, acted as observer. He had gone up to have a look at the country, but he made a general reconnaissance report which was very comprehensive. His shoulder was grazed by a bullet fired from the ground.



Dunes 100' high

BATTLE OF ROMANI.

Showing Stages of Turkish Advance & Action at Bir el Abd, during Retreat.

Scale.



Sand and scrub

Hod el Bada

attack developed, but it was subsequently known that the delay was due to the difficulty of moving heavy artillery across the sandy desert. From the air reports it was estimated, on the 31st of July, that the strength of the Turkish and German forces assembled for the attack was about 13,000.¹

On the 29th of July the Royal Flying Corps had, under orders, begun offensive operations against the enemy troops. On that day two aeroplanes bombed the camel lines at Bir el Mazar with ten 20-lb bombs. On the morning of the 1st of August aeroplanes co-operated with monitors in a bombardment of the Turkish camps at Negiliat and Oghratina, and in the afternoon of the same day five pilots bombed the camps (fifteen 20-lb. bombs) and also the head-quarters camp at Dhaba (seventeen 20-lb. bombs). Orders of Brigadier-General Salmond, issued on the 1st, instructed the Royal Flying Corps officer at the landing-ground at Romani to send out, immediately the Turkish attack began, the wireless signal 'Q' repeatedly. On receipt of this warning an aeroplane was to go up from Qantara to report the direction and weight of the enemy's attack, and the observer was to indicate the main body of enemy troops by dropping smoke balls on them. Thereafter pilots were to use the landing-ground at Romani for direct co-operation with the 52nd Division and with the Anzac Mounted Division.

The full disposition of the Royal Flying Corps in the Middle East on the 1st of August was: *Ismailia*, Fifth Wing head-quarters, and the head-quarters and one and a half Flights of No. 14 Squadron; *Qantara*, one Flight of No. 14; *Port Said*, half-Flight of No. 14; *Suez*, one Flight of No. 1 Australian Squadron; *Heliopolis*, head-quarters and one Flight of No. 1 Australian Squadron; and *Kharga* (western desert) one Flight of No. 1 Australian Squadron. The orders issued on the 1st stated that Qantara would act as a reserve for Romani in addition to its work for the Section Head-quarters and the 42nd Division, that *Ismailia* would act as a reserve for Qantara apart from the work required by General Head-quarters,

¹ The actual ration strength of the enemy attackers was 16,000.

and that Suez and Heliopolis would be the reserve for Ismailia. A wireless-fitted aeroplane was to co-operate, during the attack, with the monitor *M.15*.

The Turks made their long-awaited assault on the night of the 3rd of August. Throughout the 4th, when the fighting developed fiercely, the air observers were able to follow and report much of the tactical flow of the battle. One observer, for an hour and a quarter, directed the monitor *M.15* on the Turkish camp at Hod um Ugba, on which four direct hits were obtained. The more distant reconnaissance flights reported no indications of Turkish reinforcements approaching the front. By the evening of the 4th the Turkish attack, made with boldness and skill, had failed, and a British advance was ordered to begin at 4 a.m. on the 5th. On the morning of the 5th the enemy fought rearguard actions, but the air reports left no doubt that the main Turkish body was in full retreat and it seemed to be clearly indicated that no stand would be attempted short of the Oghratina positions. The Turks did make a stand at Oghratina on the 6th of August, but, in the afternoon of that day, observers reported that although the Oghratina line was still held, the enemy troops were draining away from it. On the 8th the line was evacuated by the Turks, but there was evidence from the air that rearguard actions might be fought to cover Bir el Abd which was also being gradually evacuated. Fighting with rearguards covering Bir el Abd took place on the 9th, but this day's action may be said to have ended the battle. Bir el Abd was found empty of enemy troops on the 12th of August and, on the same day, the air observers reported that the evacuation of Salmana was proceeding. Next morning, the 13th, Salmana was occupied by the British and the enemy withdrew to El Arish, but left an outpost force at Bir el Mazar. The Turks had suffered a severe defeat and had lost about four thousand men taken prisoner, nearly a quarter of the force engaged. The British casualties were 1,130, of whom 202 had been killed. The threat to the Suez Canal had been finally removed.

All the available aeroplanes of the Royal Flying Corps

had been drawn upon during the battle. They never totalled more than seventeen at any one time, but the pilots and observers made two or three service flights each day while the action lasted. There were a few combats with enemy pilots during the operations and as a result six Royal Flying Corps officers were wounded (one fatally), and one enemy aeroplane was shot down and seen to crash. Another Royal Flying Corps aeroplane was brought down by anti-aircraft fire twelve miles east of the British lines. It was destroyed by the pilot who, with his observer, walked to a British outpost.

Brigadier-General E. W. C. Chaytor has recounted an episode of which he was a witness on the 11th of August. He was making a reconnaissance on horseback of Bir el Abd when he saw a British aeroplane under gun-fire over that place. 'Suddenly', he says, 'the anti-aircraft fire was 'switched off and an enemy aeroplane swooped down on 'ours which was apparently badly damaged, but shortly 'steadied and came down about three-quarters of a mile 'south-east of my head-quarters. Captain Rhodes, my 'aide-de-camp, went off to locate the plane to give first 'aid, and I to head-quarters to send an ambulance. On 'finding the plane Captain Rhodes found that the pilot, 'Second Lieutenant E. W. Edwards, who was very badly 'wounded—I think seven bullets had hit him, one of 'which broke his lower jaw on both sides, another his 'shoulder—had gone off to get help for the observer who 'was shot through the chest and could not move. The 'observer, Second Lieutenant J. Brown, though in great 'pain, refused to have his wounds attended to until he had 'made his report, as he said they had some important 'information and he was afraid he would faint if his wound 'was touched. He very gallantly held himself together until 'he had dictated his report and verified it and then, his duty 'done, fainted and died two hours later.' The aeroplane concerned in this adventure was a B.E.2c of No. 14 Squadron.

Now that the threat to the Suez Canal had been ended, Sir Archibald Murray decided to transfer his head-quarters from Ismailia to Cairo, where he would be in

close touch with the many problems associated with internal affairs in Egypt. At his suggestion the War Office agreed that the troops on the Canal and in Sinai should be organized as a corps command, to be known as the Eastern Frontier Force. Lieutenant-General Sir Charles M. Dobell, who was appointed to the command of the 'Eastern Force', as it came to be called, took over the head-quarters at Ismailia on the 18th of October and on the same day General Head-quarters opened at Cairo.

Although it was not until the end of the year that important military operations were resumed on the Sinai front, there was little slackening of activity in the air, where the German pilots continued to be aggressive. On the 1st of September they bombed Port Said and caused forty-six casualties (ten killed, thirty-six wounded), but no damage to the port. One of the enemy bombs struck the seaplane carrier, *Raven II*, wounding eight men and causing damage which made it impossible for the carrier to sail on a projected expedition to the Red Sea. On the following day six B.E.2c's, flown as single-seaters, attacked the Turkish waterworks at Maghara with thirty-six 20-lb. bombs. One of the bombing pilots had to make a forced landing in the desert and another, who went down to rescue the first pilot, hit a boulder and damaged his aeroplane. Two other pilots then landed, picked up the two officers, and flew back with them to the aerodrome at Ismailia. On the 6th of September the German aerodrome at El Arish was attacked with twelve 20-lb. bombs.

In the middle of September a cavalry raid on the enemy outpost at Bir el Mazar was made. The British force assembled at Salmana on the 16th of September, but as the palm groves at that place offered poor cover, and because the intention was to surprise the Turkish garrison, the Royal Flying Corps was instructed to take special measures to prevent German aircraft from making reconnaissances. Accordingly, by moonlight on the night of the 15th/16th, two pilots dropped sixteen 20-lb. bombs on the enemy aerodrome at El Arish, and, during the 16th, air patrols were arranged with the object of intercepting any enemy aeroplanes which attempted to reconnoitre.

The patrols were not successful. One patrolling aeroplane was forced to land because of damage inflicted by a chance bullet fired at long range by a German pilot, and another went down with engine trouble. The consequence was that a German pilot found the way open to Salmana and he discovered the cavalry concentration and dropped bombs without, however, inflicting casualties. All hope of surprising the garrison at Bir el Mazar had gone, but the attack proceeded: it was delivered at dawn on the 17th and found the Turkish troops well positioned and alert and, after a short time, the action was broken off.

Ships of the East Indies Squadron had been off the coast at dawn on the 17th ready to bombard the aerodrome and camps at El Arish and targets on the El Arish-Bir el Mazar road. The aircraft carrier *Ben-my-Chree* accompanied the ships with orders to send seaplanes to spot for the sloop *Espiègle* and the monitors *M.15* and *M.31*. The first seaplane rose at 5.24 a.m. and fourteen minutes later six were in the air. One of them, a Short, was to direct the fire of the monitors on El Arish, while another Short had orders to watch the El Arish-Bir el Mazar road for targets suitable for the fire of the *Espiègle*. Each Short was escorted by two Sopwith 'Baby' seaplanes. The attempted bombardment was defeated by German aeroplanes. As soon as the Short with its two escorting seaplanes appeared over El Arish, a German single-seater fighter, presumably a Fokker, ascended and engaged them. The enemy fighter, which was faster than the seaplanes and skilfully handled, quickly shot down the two escorting Sopwiths. One of them fell in flames and the other, damaged, was forced to alight on the water. The German pilot then attacked the Short, but after a sharp indecisive fight the seaplane returned to the *Ben-my-Chree*. The remaining three seaplanes, meanwhile, finding no movements on the El Arish-Bir el Mazar road, had turned back to the carrier, but on the way one of them—a Sopwith—was hit by machine-gun fire from the ground and collapsed when a forced landing was made on the sea: the pilot was rescued by a trawler. Not content with their success in defeating the attempted bombardment, the German pilots

attacked the ships with bombs, but they did not make any direct hits. Although the attack on El Arish from the sea had failed, it had been made clear to the German air service that the aerodrome was unduly vulnerable. It was therefore evacuated and the enemy squadron moved back to Beersheba, as was discovered by the Royal Flying Corps.

On the 13th of October a cavalry and camelry force moved out from Bir Bayud to make a raid on the Turkish post at Bir el Maghara, fifty miles south-east of Romani on the northern spurs of the Sinai hills. Plans of the enemy camp and of the approaches through the hills had been compiled for the use of the attacking column from air photographs. Aeroplanes, using an advanced landing-ground at Salmana, co-operated with the column and although there was mist the observers were able to say, by dropped messages, what positions the enemy was holding. The Turks were driven from their advanced positions on the morning of the 15th, but after a fight which lasted two hours the attack was broken off. When a signal was displayed for the information of the air observers that the column was about to retire, one of the pilots went down to 200 feet and attacked the Turkish camps with bombs and machine-gun fire. In all, forty 20-lb. bombs were dropped on the enemy camps: one of them exploded in a compartment of a reservoir which burst.

By November 1916 the British force had covered more than half the distance between Qantara and the Palestine frontier. 'The desert, till then almost destitute of human 'habitation,' wrote Sir Archibald Murray in his dispatch, 'showed the successive marks of our advance in the shape 'of strong positions firmly entrenched and protected by 'hundreds of miles of barbed wire, of standing camps 'where troops could shelter in comfortable huts, of tanks 'and reservoirs, of railway stations and sidings, of aero-'dromes and of signal stations and wireless installations, by 'all of which the desert was subdued and made habitable, 'and adequate lines of communication established between 'the advancing troops and their ever-receding base.' By

November, also, the menace from the Senussi in the western desert had ceased to be serious.¹ The Grand Senussi had been forced to retire to the Siwa oasis and it had been decided that the western frontier of Egypt could be defended by a series of restricted patrols, a form of defence which made it possible to transfer appreciable forces from the western to the eastern front. The time had come when Sir Archibald Murray could take another step forward in Sinai. His plan was to secure El Arish as a base for offensive action against the Turks in southern Syria.

The movements of the air detachments in November were as follows: 'A' Flight of No. 67 (Australian) Squadron was brought back from Sherika, in the Kharga oasis, to Qantara on the 8th. On the same day 'B' Flight of No. 14 Squadron was transferred from Suez to Ismailia to take the place of 'A' Flight of the same squadron which had moved forward to Salmana on the 4th. On the 24th of November 'A' Flight moved to Mustabig, nearer El Arish.

Instead of being required to watch a comparatively straight front, the Royal Flying Corps had to protect a line which, by the end of November, had reached a point seventy miles east of the Canal in the northern sector, extended in a wide semicircle back to the Canal at Qantara, and continued thence along the Canal to the Red Sea. Under these new conditions the main tasks of the air service were: (i) reconnaissance of El Arish and its lines of communication; (ii) adequate reconnaissance of Maghara and its neighbourhood to prevent a surprise attack against the British flank; and (iii) a routine patrol, up to a distance of about forty miles east of the Canal, of the central and southern sectors from Qantara to Suez.

In addition to the daily reconnaissances there were occasional bombing raids. On the 11th of November an attack on Beersheba was made by five B.E.2c's and by one Martinsyde which had the aerodrome and the railway station for objectives. A second attack, by a similar

¹ See p. 191.

formation, was made at the same time on Turkish camps at Bir Lahfan and at Magdhaba in the Wadi El Arish. In retaliation, one German aeroplane attacked Cairo on the 13th with ten light-weight bombs which did little damage, but killed one soldier and thirteen civilians and wounded twenty-five civilians.

In December the air detachments were concentrated for the impending operations against El Arish. On the 19th the Fifth Wing head-quarters was transferred to Mustabig from Ismailia and, by that date, No. 67 (Australian) Squadron and No. 14 Squadron¹ were operating from the Mustabig aerodrome.

Early on the morning of the 20th, just when the preparations for the advance had been completed, an air observer came back with news that the hospitals and tents had been moved from El Arish, and he stated his conviction that the town had been evacuated. In the afternoon it was further reported from the air that the Turks had abandoned their positions at Maghara. It was clear that it was no longer necessary to rely upon a methodical infantry advance, and the Australian and New Zealand Mounted Division and the Imperial Camel Brigade were therefore ordered to move on El Arish that night. On the morning of the 21st, air observers reported that the town was completely encircled by the mounted troops and that no resistance was being offered. El Arish was subsequently found empty of Turks, and by the 23rd the first ship was unloading supplies at the port.

Air reconnaissances revealed that the bulk of the enemy forces from El Arish had retreated south-east along the Wadi el Arish, and that a considerable body was encamped at Magdhaba. On this information, Lieutenant-General Sir Philip W. Chetwode, commanding the Desert Column,² decided on the 22nd to advance on Magdhaba with his

¹ Less 'C' Flight which had left for operations in Arabia on the 13th of November. See pp. 220-4.

² The Desert Column, which had been formed on the 7th of December, began with (approximately) the troops of what had been No. 3 section, canal defences. The composition of the Desert Column varied from time to time.

main mounted forces. On the same day the Turkish camps were attacked by ten B.E.2c's of No. 67 (Australian) Squadron and by three of No. 14 Squadron. A total of six 100-lb. and one hundred and twenty 16-lb. or 20-lb. bombs were dropped on the camps and many hits were made.

The attack on Magdhaba, which aimed at encirclement, was made on the 23rd of December. One of the first aeroplanes over the Turkish positions drew fire from various points along the bed of the Wadi el Arish, a useful indication of the places held by the enemy. Early air reports also gave the welcome news that there were no signs of reinforcements on the move. At 10 a.m., however, a disquieting message was dropped. This said that the Turks were withdrawing, and to prevent their escape orders were at once given to the 1st Light Horse Brigade to move straight on Magdhaba. The mounted troops, however, were met with heavy fire, and as it was obvious that no evacuation of the Turkish positions had taken place, the troopers moved to the shelter of the main wadi with a view to making a dismounted attack along its bed. The air observer had been misled, and it is now possible to say why. In the early morning, while the British were still moving forward, attacks on the Turkish positions had been made by pilots and observers with bomb and machine-gun. It is probable that the bombing undermined the morale of the Arab soldiers with the Turkish forces. What is certain is that many of them fled from their positions, and it was this movement of demoralized troops which had deceived the air observer.

The British attack was pressed with determination and, by 4.30 p.m., all organized resistance had been ended and the Turkish garrison, 1,282 strong, with a great quantity of ammunition, was captured; the British losses were 146 (twenty-two killed). After destroying timber and stores the British force marched back to El Arish. The Turks, warned by the fate of the Magdhaba garrison, withdrew the remainder of their posts from Sinai territory before the end of the year, leaving the Peninsula to the British.

THE ADVANCE INTO PALESTINE

1917

For a bird of the air shall carry the voice, and that which hath wings shall tell the matter.

(Ecclesiastes x. 20.)

The Action of Rafah

[Maps, pp. 161 and 209]

At the beginning of January 1917 an enemy force, estimated at about 2,000 men with mountain artillery, was entrenched at El Magruntein, south-west of Rafah. The position had been discovered by the Royal Flying Corps on the 27th of December and visual and photographic reconnaissances had been made thereafter until all the enemy entrenchments and redoubts had been plotted. From the 5th to the 8th of January there were extensions of the defence lines which were closely watched from the air. Meanwhile another position had been found at Weli Sheikh Nuran on the left bank of the Wadi Ghazze, where on the 7th a new force of about 1,000 men was seen. Next day the air observers discovered that much work had been done on the Nuran defences since the earlier observation and that additional troops, estimated at about 500, had arrived.

This air information provided material on which military plans could be based for an attempt to capture the El Magruntein garrison which covered Rafah. The Turks had suffered a heavy defeat at Magdhaba on the 22nd of December because they had left an unsupported garrison within striking distance of British mounted troops, but it appeared that the enemy command had been slow to learn a lesson. The air reports showed that the troops covering Rafah were also unsupported, the nearest body—that discovered at Weli Sheikh Nuran on the 7th—being ten miles distant. Although it was impossible, until the railway and pipe-line had been much farther advanced, to plan an action to occupy Rafah itself, Lieutenant-General Sir P. W. Chetwode saw an opportunity for another raid of the kind which had been so successfully made on Magdhaba; he decided to command the raid in person.

The Desert Column moved out of El Arish at 4 p.m. on the 8th of January. To ensure surprise, air patrols were maintained over the Rafah area until dusk to prevent enemy airmen from reconnoitring the column, but, in fact, no enemy aeroplanes appeared. At dawn next morning the Desert Column was approaching the Rafah defences. Aeroplanes, operating from an advanced landing-ground at Sheikh Zowaiid, were flying over the Turkish positions from 7 a.m., and the early observers reported the roads east and south-east of Rafah clear of troops. When this information reached Major-General Sir H. G. Chauvel, the General Officer Commanding the Australian and New Zealand Mounted Division, at 8.30 a.m., he issued orders which aimed at an encirclement of the Turkish positions, to be followed by a direct assault. The Royal Flying Corps had five wireless-receiving stations in use, four with the Royal Horse Artillery and one at a Royal Flying Corps report centre. Those accompanying the artillery were transported on sand sleighs, the operators riding on horse-back. Two aeroplanes, working on different wave-lengths, were maintained in the air throughout the day, and, especially in the afternoon when artillery-fire was directed on specific targets marked on the map, the observers gave valuable help to the gunners. Three Martinsydes, escorted by three Bristol Scouts, bombed the aerodrome at Beersheba: six enemy aeroplanes were wheeled out of their sheds on the approach of the bombers, but only one left the ground.

At 4.30 p.m., when the last aeroplane left the area of the battle, the fight was still in progress, although the Turkish position was enveloped. Five minutes before the aeroplane left, an enemy column, estimated at about 1,200 men with six guns, had been observed marching to reinforce the Rafah defenders. The column, when seen, was between Shellal and Weli Sheikh Nuran, and this air information confirmed the statement of an officer prisoner, taken earlier in the afternoon, that a reinforcing regiment was on the way. It was realized that if the Turkish positions were not captured quickly the enemy reinforcements might turn the scale against the attackers, and

orders were written directing that the engagement be broken off, but before they could be issued a final assault had been launched which proved entirely successful. The garrison, numbering 1,635, including thirty-five officers, among them the Turkish commander, was captured. The British losses in this brilliant little action were 487 (seventy-one killed). The Desert Column, its main task accomplished, withdrew, but when, next morning, air reports revealed that the Turks had made no attempt to reoccupy Rafah, a small force was sent back with all available limbered wagons to bring in captured material. The two actions at Magdhaba and Rafah provide good examples of the value of air co-operation in the type of warfare fought in the desert.¹

Two days after the Rafah attack, the Commander-in-Chief in Egypt was informed by War Office telegram that the Government had decided to defer large-scale operations against Palestine until the autumn, and that the general policy during the summer would be one of preparation for the autumn campaign. Subsequently, however, when the Allied plans for the 1917 Spring offensive in all theatres of war were finally settled, Sir Archibald Murray was asked to 'exert pressure' on the enemy with a view to helping the offensives on other fronts.

Throughout January 1917 the important areas in southern Palestine, as far north as Er Ramle and as far east as the Jordan, were reconnoitred from the air. The enemy aerodrome at Beersheba was bombed five times during the month, notably on the night of the 14th/15th by three aeroplanes, on the 15th by six, and on the 16th by eleven aeroplanes. These bombing attacks probably helped to persuade the German air service to vacate the

¹ The Chief of the General Staff conveyed the Commander-in-Chief's appreciation of the work of the Royal Flying Corps in a letter saying: 'He considers that the thoroughness and efficiency shown in the preliminary work, no less than the active participation taken by our aircraft in the final attack materially contributed to the defeat of the enemy. Thanks to the skilful patrolling on the eastern and south-eastern flanks of our force during the forenoon of the 9th, enemy reinforcements were located and ample warning of their advance was given to the General Officer Commanding the Desert Column.'

Beersheba aerodrome, which it did about the middle of the month. It was discovered, on the 29th of January, that a new aerodrome had been constructed at Er Ramle.

Air reconnaissance showed that, after the action at Rafah, the enemy concentrated his forces near Shellal, and he proceeded with the fortification of his defensive positions about Weli Sheikh Nuran which commanded the junction of the roads from Tell esh Sheria to Beersheba and Rafah. During January the positions were rapidly extended in a southerly direction to command the two main roads leading to the Wadi Ghazze from Rafah and from Karm Ibn Musleh, and the positions continued to be fortified until they constituted the most elaborate system of defences which had been seen up to that time in the Sinai-Palestine area. Every day the observers flew over the Turkish defence lines, keeping watch on the progress of the work: the squadrons operated, from the 18th of January onwards, from a new aerodrome at Ujret el Zol.

The railway through Sinai, on which the British force depended, was pushed forward methodically and, by the 1st of March, had reached Sheikh Zowaiid, to which place the head-quarters of the Desert Column was moved. Rapid construction of the railway was of great importance and the Royal Flying Corps had been asked on the 1st of February to cease, for the time being, from making bombing attacks on the enemy as they were calculated to bring retaliation against the camps of the Egyptian Labour Corps which was building the line. It had been found that a few bombs dropped by German airmen sufficed to induce panic among the native labourers, who scattered widely, with a consequent appreciable delay in their work. The order against bombing was relaxed on five occasions during February, when attacks were made on the German aerodromes at Beersheba and Er Ramle.

It was discovered, during February, that the Turks had reoccupied Nekhl and Bir el Hassana with small detachments, and three British columns were sent to attack these posts on the 18th. The enemy detachment at Nekhl, warned of the British advance by Bedouin tribesmen, escaped, but the small garrison at Hassana was surprised

and captured. Aeroplanes, working from the aerodrome at Ismailia, accompanied each column during the advance.

Meanwhile, preparations had been completed for an attack on the main Turkish positions at Shellal, but on the afternoon of the 5th of March, when all was ready to begin, it was discovered from the air that the Turks were evacuating the whole of their elaborate defences. Orders were at once given to the Royal Flying Corps to hamper the withdrawal by bombing. From the 5th to the 8th inclusive, attacks were made, by day and by night, on Beersheba, on Tell esh Sheria (where the wadi was crossed by the railway), on the junction of the Beersheba railway with the Jerusalem-Jaffa line, and on enemy cavalry and infantry camps. In all thirty aeroplanes were engaged in these operations and a total of $2\frac{3}{4}$ tons of bombs was dropped. There is evidence that the bombing attacks caused much annoyance and some casualties, but they achieved no strategic results, and the Turkish forces duly settled in new positions at Gaza and Tell esh Sheria, fourteen miles north and north-east of Shellal. The enemy withdrawal had been of a limited kind, but the Turks had moved out of reach until such time as the railway could be extended at least as far as Rafah.

While the further preparations were proceeding for an attack on the new positions, the Royal Flying Corps made daily tactical reconnaissances of the defences at Gaza, Abu Hureira, and Beersheba. These were photographed and from the photographs trench maps were prepared. The construction of a branch railway line from the main line at Et Tine through El Qastine towards Gaza was closely followed, and the course of the railway from Sheria to Junction station was plotted. Bombing attacks were made on Junction station, on Ramle aerodrome, and on various points along the railway north of the Wadi el Hesi. It was during one of these attacks, on the 20th of March, that Lieutenant F. H. McNamara, an Australian officer of No. 67 (Australian) Squadron, won the first Victoria Cross to be awarded to a flying officer in the Middle East. The War Diary records: 'During an attack on the railway 'near Tell el Hesi, Captain Rutherford of No. 67 (Austra-

lian) Squadron, on a B.E.2c, was forced to land with engine trouble. Lieutenant McNamara, on a Martinsyde Scout, descended under heavy rifle fire to his rescue, in spite of the fact that he had already been severely wounded in the thigh. He landed about 200 yards from the B.E.2c, but owing to his wound was unable to get out of the machine. Captain Rutherford ran to ask his assistance to re-start his engine. As this was not possible and as hostile cavalry were rapidly approaching it was decided to leave at once in the Martinsyde. Captain Rutherford climbed on the fuselage behind Lieutenant McNamara, but in taking off, the latter, owing to his injured leg, was unable to keep the machine straight and it turned over. The two officers extricated themselves and set the machine on fire. Meanwhile the pilots of two other aeroplanes, realizing the situation, attacked and held off the cavalry by repeatedly sweeping them with bursts of machine-gun fire. Captain Rutherford then assisted Lieutenant McNamara to the B.E.2c and lifted him into the pilot's seat. Then, still under heavy fire, he swung the propeller and climbed into the observer's seat. Lieutenant McNamara took off successfully and although weak from loss of blood, managed to fly the B.E.2c back to his aerodrome, a distance of seventy miles.'

An instance showing the incidental dangers which flying over Palestine entailed may also be quoted. On the 24th of March Lieutenant W. E. L. Seward of No. 14 Squadron was over Er Ramle in a Martinsyde, acting as escort for a reconnaissance B.E.2c., when the main petrol tank in the Martinsyde was pierced by an anti-aircraft shell. The pilot got back as far as a point on the coast four miles north of Ashkelon before his engine failed. To avoid possible capture of his aeroplane he landed in the sea, but it happened that he came down within two hundred yards of a Turkish post on shore and fire was opened on him. He swam out to sea, gradually threw off his clothing, and then swam southwards for four hours, at the end of which time, cold and exhausted, he scrambled ashore. He lay hid in the sandhills until darkness set in and then he made his way, naked and barefooted,

along the beach, past Gaza, to the Wadi Ghazze, a distance of thirteen miles. During this journey he had five times to take to the sea to escape Turkish patrols. Towards dawn he scraped a hole for himself in the sand and he lay there, weary but safe, for several hours, and then, soon after he had resumed his journey, he fell in with a British cavalry patrol.

The First Battle of Gaza

[Maps, pp. 161 and 209]

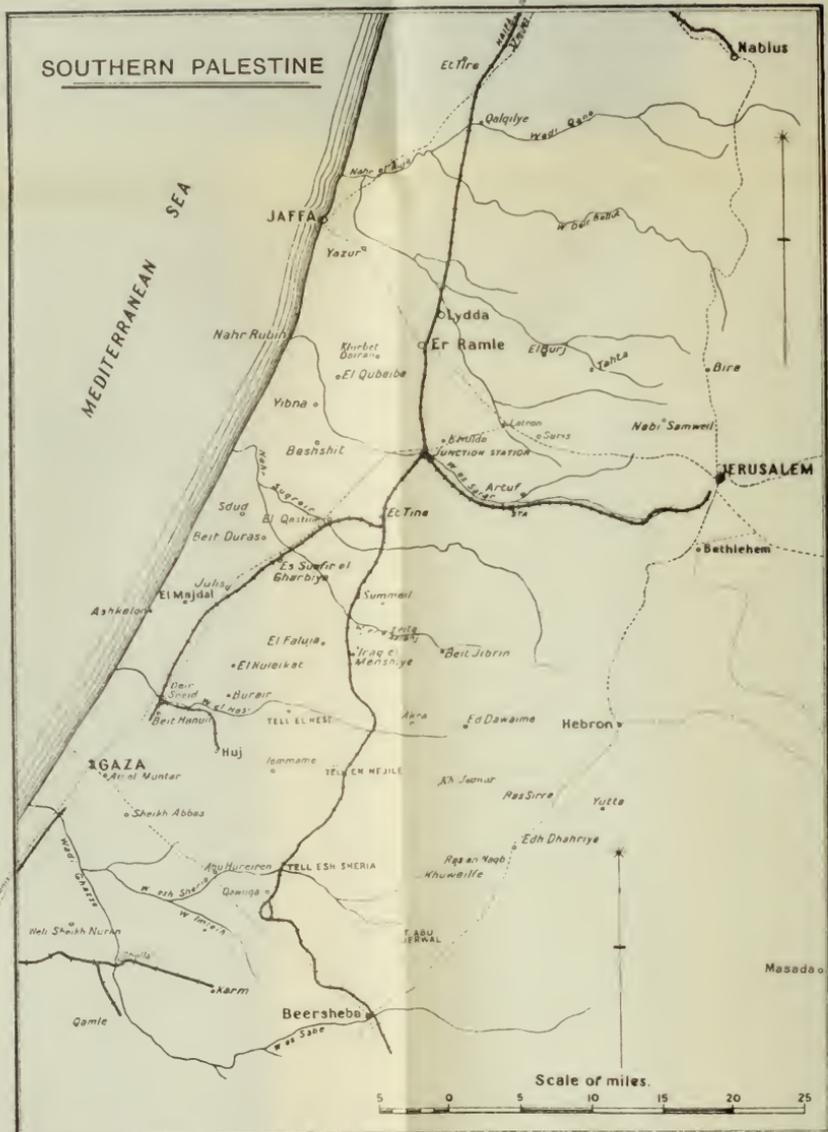
By the 21st of March 1917 the railhead had reached Rafah and the final preparations for the British attack could be made. Sir Archibald Murray decided that the direction of his advance must be along the coast, and his attack, therefore, had the Gaza defences for objective. The action was to be a cutting-out expedition, similar, although on a larger scale, to the raids which had brought success at Magdhaba and Rafah. The operations were to be under the direction of Lieutenant-General Sir Charles M. Dobell, commanding the Eastern Force, who was instructed to gain the line of the Wadi Ghazze to cover the advance of the railway, to take steps to prevent the enemy from withdrawing unmolested, and to capture Gaza and its garrison by a *coup de main*.

The Eastern Force comprised the Desert Column¹ under the command of Lieutenant-General Sir P. W. Chetwode, the Imperial Camel Brigade, the 52nd and 54th Divisions, and the 229th Brigade, which was the only formation of the 74th Division as yet available. The Desert Column was to make the attack on the 26th of March, while the remainder of the Eastern Force, directly under the command of the G.O.C., Eastern Force, moved forward to be ready to give support if required.

Two Flights of No. 67 (Australian) Squadron moved to an aerodrome at Rafah on the 25th of March and, during the battle, the remaining aeroplanes of the Fifth Wing,

¹ That is, the Australian and New Zealand Mounted Division (less the 1st Light Horse Brigade); the Imperial Mounted Division (less the 4th Light Horse Brigade); and the 53rd Division.

SOUTHERN PALESTINE



PREPARED IN HISTORICAL SECTION (MILITARY BRANCH)
1915

now commanded by Lieutenant-Colonel A. E. Borton,¹ operated from the Rafah aerodrome, but they returned to their main aerodrome at Ujret el Zol (kilo 143) each night.

In the operation orders issued by Sir Charles Dobell on the 24th of March it was stated: 'A permanent contact patrol of one aeroplane will be maintained with the Desert Column, reporting direct to battle head-quarters, Desert Column. G.O.C. Desert Column will be responsible for transmitting information received from this contact patrol to Eastern Force head-quarters, or battle head-quarters, as the case may be. Five aeroplanes will be detailed for general reconnaissance, reporting to battle head-quarters, Eastern Force; all information gained by these aeroplanes of movements of the enemy main body (at present in the Tell en Nejile-Huj area) or of his central detachment (at present in the Tell esh Sheria-Abu Hureira area), or of the approach of enemy troops from the Lydda-Er Ramle area, will be dropped at battle head-quarters, Desert Column, as well as at battle head-quarters, Eastern Force. Six aeroplanes will be detailed for co-operation with the artillery. A wireless-receiving station is allotted to the heavy artillery, three to each division, and two to each mounted division. Six aeroplanes will be detailed for patrol duties.'

A supplementary order, issued on the 25th of March, stated: 'If during the attack on Gaza the enemy should make any forward movement in strength from the Tell en Nejile-Huj area or the Tell esh Sheria-Abu Hureira area, or from both, the O.C., Fifth Wing, Royal Flying Corps, will prepare immediate arrangements for sending out all available machines for offensive action against the advancing enemy troops, at the same time reporting his action to battle head-quarters, Eastern Force.' It was made clear, however, that the duties outlined in the earlier

¹ Lieutenant-Colonel A. E. Borton had succeeded Lieutenant-Colonel P. B. Joubert de la Ferté on the 5th of February 1917. The strength of the two squadrons (Nos. 14 and 67 Australian) which made up the Fifth Wing is available for the 22nd of March 1917. The return shows that there were 21 B.E.2c's and e's, 14 Martinsydes, and 7 Bristol Scouts. Only 12 B.E.'s and 9 Martinsydes are shown as serviceable. In addition there was a B.E. Flight on service in Arabia. See pp. 220-4.

order of the 24th were to continue until definite instructions for air offensive action, if and when the opportunity arrived, were given from Eastern Force head-quarters.

It is possible, from German and Turkish sources, to throw more light on the disposition of the enemy reserves before the battle began. In the early part of March, Gaza was held by a weak garrison of two battalions and two batteries. The Turkish 16th Division was at Tell esh Sheria, fifteen miles south-east of Gaza, the Turkish 3rd Division was in reserve at Jemmame, eleven and a half miles east of Gaza, while at Beersheba was a cavalry brigade and a weak regiment of the Arab 27th Division.

Had this disposition been maintained to the eve of the battle, an important British success could not, it may be asserted, have been prevented. The enemy forces, however, were redistributed as a result of information supplied by the German air service. Day after day German aeroplanes flew over the British camps, and as they were able to out-distance the aeroplanes of the Royal Flying Corps they could not be prevented from making detailed reconnaissances. It has been recorded that, 'according to the assertion of his Excellency Djemal Pasha, the Air Force had saved the situation during the First battle of 'Gaza'.¹ This is true, as is made clear by the German Commander Kress, writing in *Zwischen Kaukasus und Sinai* (Vol. I, pp. 26-9). Kress says that he concluded from the excellent air reports which he received in the second half of March that the British intended to make an attack in the direction of Gaza. So impressed was he that he took energetic action. Part of the Turkish 16th Division was moved into Gaza from Tell esh Sheria, to give the garrison a total of seven battalions, and the defences of the town were also considerably strengthened with additional artillery. Orders were given for the Turkish 53rd Division, which had been maintained at Jaffa and Er Ramle because of fears of a British landing, to march down the coast to Gaza. One of the two regiments, making up this division, was due at El Majdal, thirteen miles along the coast north-east of Gaza, on the 26th, the day the battle opened.

¹ Neumann, *Die Deutschen Luftstreitkräfte im Weltkriege*, p. 524.

The other regiment apparently remained at Er Ramle. Kress himself shifted his command post from Beersheba to Tell esh Sheria in order to be nearer the scene of action when the British attacked.

On the morning of the 26th of March, in a thick fog, the British forces moved forward. The fog lifted at 7.30 a.m., but the visibility continued poor for another hour. British and German aeroplanes were out early, their observers trying, through the mist, to follow the progress of the attack. Once again Kress was well served by his air service. He records that about 8 a.m. he received at his head-quarters at Tell esh Sheria a report from one of his flying officers which told him that strong British forces, amounting to about two infantry divisions, were advancing on Gaza from the south, and that a force of cavalry, with armoured cars, had broken through between Gaza and Tell esh Sheria. He promptly ordered the Gaza garrison to hold out to the last man, gave instructions for the regiment of the Turkish 53rd Division, due to reach El Majdal that day, to continue its march to Gaza, ordered the Turkish 3rd Division in the Jemmame area to advance on the line Gaza-Ali el Muntar, the 16th Division to move from Tell esh Sheria against the British rear with its objective at the point where the Khan Yunis-Gaza road crossed the Wadi Ghazze, and, finally, instructed the Beersheba group to advance by way of Shellal in the direction of Khan Yunis.

Had the Turks displayed the same energy and decision in moving as Kress had shown in the orders he issued to meet the situation, most of the Turkish reinforcements would have been in action with the British near Gaza before darkness fell on the 26th. There were, however, many delays before the troops began to move, and the most forward ones were ultimately checked by British mounted troops and armoured cars, so that by nightfall they had covered little more than half the distance to Gaza.

Meanwhile, from the time the fog began to lift, the pilots and observers of the Fifth Wing reported the progress of the attack, co-operated with the artillery, maintained patrols to counter enemy aircraft, and reconnoitred the

areas in which the Turkish reserves were known or thought to be. The air reports (the first of which had been received at battle head-quarters of the Eastern Force at 10 a.m.) showed that by 11 a.m. Gaza had been surrounded by mounted troops. The Ali el Muntar ridge, however, which dominated the town, presented a formidable obstacle to the 53rd Division and was not wholly captured until 6.30 p.m. A contact-patrol observer was over this area at 4.10 p.m. and his subsequent report showed that British infantry at that time were about 300 yards east of the *Labyrinth*, a maze of entrenched gardens left of the Ali el Muntar ridge, but the report made no reference to the ridge itself. After this observation had been made the aeroplane continued on its way to see what was happening at Huj and at Hureira.

At 4 p.m. the Anzac Mounted Division had reported to Desert Column head-quarters that three enemy columns were said to be advancing near Deir Sneid, and the message asked that an aeroplane reconnaissance should be made to verify this information. So far as can be ascertained, the contact-patrol aeroplane which would in the ordinary way have been sent to make a final survey of the Gaza area before darkness fell, was diverted, as a result of the message from the Anzac Mounted Division, to the Deir Sneid area, where the observer discovered that about 2,000 Turks were entrenching. At 4.50 p.m. a message was sent to Desert Column head-quarters from the Imperial Mounted Division which told of 3,000 Turkish infantry and cavalry advancing from Huj in a south-westerly direction. An air observer had flown over the Huj area just after 4.30 p.m. and he had seen these Turks, who had apparently collected in the broken ground of the Akra area, debouching upon the uplands west of Huj. At 5 p.m. this column (estimated at about 8,000 infantry) was seen by another observer to be marching towards Gaza with its head $1\frac{1}{2}$ miles south-west of Huj. The aeroplane landed at 5.45 p.m. after dropping messages giving this information at head-quarters. The Beersheba Group was also discovered on the move from the air in the afternoon.

Sunset on the 26th of March was at 6 p.m. (Cairo

time), and darkness in the latitude of Palestine follows sunset with some rapidity. The position, as Eastern Force head-quarters saw it, was that Gaza had not fallen and that appreciable Turkish reinforcements were moving against the British from the north and from the east. Lieutenant-General Dobell was, from the beginning, apprehensive of a strong enemy counter-attack against the right rear of his force, and that he had grounds for his anxiety is apparent from the orders issued by Kress to which reference has already been made. Lieutenant-General Chetwode, commanding the Desert Column, concluded, as the sun went down with the Ali el Muntar ridge still not completely captured, that he could no longer leave the mounted troops with half their numbers involved in fighting in the gardens of Gaza, while the Turks attacked the other half from north and east. At 6.10 p.m., therefore, with the approval of Lieutenant-General Dobell, he ordered that the mounted troops should break off the action and retire across the Wadi Ghazze.

So began the withdrawal which sealed the failure of the first battle of Gaza. After the orders to withdraw had been issued there ensued some confusion and misunderstanding,¹ but, on the evening of the 26th, and during the 27th, the withdrawal proceeded, and by the 28th a position had been taken up on the south bank of the Wadi Ghazze.

On the morning of the 27th of March air reconnaissances reported strong Turkish columns converging on Gaza, and when this information was received bombing aircraft were at once sent out, but the pilots found that the enemy had gained the shelter of the town and they therefore attacked alternative targets of transport and bivouacs. In the afternoon another Turkish column was reported near Sheikh Abbas and it was attacked from the air with machine-gun fire. On this day, also, the artillery observation of the Royal Flying Corps achieved good results. On three occasions 60-pdr. batteries were directed on massed bodies of Turkish troops, and appreciable casualties were inflicted. In all, during the three days from the 26th to

¹ See *Military Operations in Egypt and Palestine* (MacMunn and Falls), Vol. I, Ch. XVII.

the 28th of March, there were twenty artillery co-operation flights. Enemy aircraft, during this period, were active and there were many combats, mostly indecisive. On the 26th an enemy two-seater was driven down and seen to crash on the Beersheba aerodrome, and on the 27th a British artillery aeroplane was forced down with its two occupants wounded, one of them fatally.

The British casualties in the first battle of Gaza were just under 4,000 (523 killed), while those of the enemy were 2,447 (301 killed, 1,061 missing). It has been made clear that the German air service contributed appreciably to the success of the Turkish resistance at Gaza. It was able to give its vital help because the German pilots flew faster and had better armed aeroplanes than those with which the Royal Flying Corps squadrons were equipped. Before the battle began the enemy air service had received eight new Rumpler aeroplanes fitted with fixed synchronized machine-guns,¹ and also a few Halberstadt fighters. The Rumpler pilots did not seek combat, but this must be set down to a desire to conserve their aeroplanes and not necessarily to any lack of the offensive spirit. Nor was it difficult for the Germans, because of their superior speed, to avoid combat. In other words, the Royal Flying Corps could not prevent the enemy from making such reconnaissances as he was determined to do. The Halberstadt fighting pilots, whose aeroplane was more speedy and handier than anything flying against them, took every opportunity to attack, and had they been more numerous they might have made it impossible for the Royal Flying Corps to do any useful work. As it was they inflicted during March, and also during April 1917, appreciable casualties on the Royal Flying Corps without any apparent harm to themselves. They demonstrated on the Sinai-Palestine front what had been made clear in air fighting in France, that numbers and courage may never fully compensate, in the air, for inferiority of equipment. Between the 9th of March and the 20th of April, although it would appear that no more than two Halberstadts were available at any one time, three British pilots failed to

¹ Neumann, *Die Deutschen Luftstreitkräfte im Weltkriege*, p. 524.

return from their missions, one died of wounds received in air combat, and three officers were wounded in air fighting. In the same period two German aeroplanes were driven down and apparently wrecked behind the enemy lines. Had the Fifth Wing had a few aeroplanes comparable in performance with the Halberstadt, the casualties would have been fewer and, no less important, the squadrons would have had the means to prevent the German pilots and observers from co-operating with the Turkish troops. The Gaza garrison was strengthened before the battle, and the Turkish reinforcements were set in motion soon after the British advance began, solely as a result of reports rendered by the German air service. The margin between victory and failure in the battle was extremely narrow, and had the British had local air superiority victory could perhaps have been assured. In April 1917 the Royal Flying Corps in France was having a difficult time, and it may be forcefully argued that no first-class fighting aeroplanes could be spared for operations in subsidiary theatres. The fact remains that failure to take Gaza at the first attempt made a great difference to the whole campaign in Palestine, and it is right to point out the effect of air superiority on the course of events, and to lay stress on the comparatively trivial resources which sufficed to give that superiority to the enemy.

The Second Battle of Gaza

After the first battle of Gaza there was a change in British Government policy affecting the campaign in Palestine. It will be recalled that although Sir Archibald Murray had been instructed to exert pressure on the enemy to help the Spring offensives on other fronts, he had been given to understand that there would be no serious operations in Palestine until the autumn of 1917. On the 30th of March, however, he was informed by telegram from the Chief of the Imperial General Staff that his immediate task must now be the defeat of the Turks south of Jerusalem and the occupation of that city.

Apart from this change in policy, which called for a methodical and consolidated advance, it was clear that the

second attempt to take Gaza would be a wholly different operation from the first. In March Gaza was a strongly held outpost, but after the first attack on the city it had become a strong point in an entrenched position which extended for twelve miles from the sea as far as Abu Hureira on the road to Beersheba. All possibility of a *coup de main* had disappeared. It would now be necessary to plan an operation approximating to siege warfare, comparable with those fought in France, in which artillery support would play a dominating part. An operation of this kind required careful preparation, and one unfortunate result would be that the enemy would be allowed time in which to strengthen his fortifications.

The main work of the Royal Flying Corps during this preparatory period for the second battle of Gaza was tactical and strategical reconnaissance, and co-operation with the artillery. From air photographs a new map, on the scale of 1 : 40,000, was made and printed in time for the operations. Enemy pilots showed appreciable activity, and, on the 12th of April, twice bombed the Royal Flying Corps aerodrome at Rafah, killing one officer and two men, and wounding seven men, without, however, inflicting much material damage.¹

The plans for the British attack included a frontal assault by three divisions, instead of one as in March, with the mounted force acting as a protective body on the right of the infantry. When Gaza had been captured the intention was to hold a position north and east of the town with two divisions while the remaining division cleared the town. The operation was to be made in two stages. The first was to be a general advance to a position

¹ At Rafah were Fifth Wing head-quarters, No. 67 (Australian) Squadron, and head-quarters and 'A' Flight of No. 14 Squadron. The Advanced Wing head-quarters and 'B' Flight of No. 14 Squadron were at Deir el Balah. The strength of the Fifth Wing in serviceable aeroplanes, just before the second battle of Gaza (14th April), was seventeen B.E.2c's and e's and eight Martinsydes. By the 20th the strength had increased to twenty B.E.2c's and e's, two Bristol Scouts, and nine Martinsydes. In addition, there were five B.E.2c's and e's on service in Arabia. On the 20th there were eight B.E.'s, seven Bristol Scouts, and two Martinsydes listed as unserviceable.

beyond the Wadi Ghazze, from which the actual attack could be launched. The second stage was to begin as soon as the necessary preparations were completed, but only about one clear day between the two stages was contemplated. During this brief pause a heavy bombardment was to be made, in which warships were to take a part. The intentions for the second stage of the operations were later modified so as to leave the General Officer Commanding the Eastern Force with a free hand.

The first phase began, and was successfully completed, with no great opposition, on the 17th of April. On the 18th there was a continuous bombardment of the Turkish positions by land and sea. On the 19th the direct assault was launched, but although it was gallantly pressed, it made little impression on the enemy chiefly because there was insufficient artillery or ammunition to support an attack on strong and well-defended positions. Orders were issued for the advance to be renewed on the 20th, but it became clear on the evening of the 19th that success was no longer possible; a line forward of the Wadi Ghazze was therefore consolidated. The British casualties from the 17th to 20th of April were 6,444 (509 killed, 1,576 missing), while those of the enemy were 2,013 (402 killed, 247 missing).

The work of the Royal Flying Corps during the battle may be briefly summarized. It consisted of co-operation with the artillery, and of tactical and strategical reconnaissances. On the 18th and 19th observation was impeded by haze and cloud, and by the dust thrown up as a result of the bombardment. Nevertheless, the air observers gave fairly full information about the progress of the battle and, from the 17th to 19th inclusive, made thirty-eight flights in co-operation with the artillery and engaged sixty-three targets, of which twenty-seven were enemy batteries. The strategical reconnaissances revealed no Turkish reinforcements moving to the battle area. The Royal Flying Corps did a notable piece of work on the 20th. A reconnaissance observer came back in the morning with the news that about 2,000 infantry and 800 cavalry were assembled in the wadi near Abu Hureira, apparently ready to make

a counter-attack on the British right. Four aeroplanes, each carrying twelve 20-lb. bombs, were sent out at once to attack the enemy concentration. The pilots found the Turkish troops, still in massed formation, and attacked them with good effect. The enemy soldiers scattered, and no counter-attack developed.¹

An attempt by the German air service to cut off the British water supply was made on the 19th of April. A two-seater aeroplane, carrying two officers who had for some time kept a careful watch on the progress of the pipe-line, landed alongside the line about ninety miles inside the British area. The officers laid a charge of explosive and were successful in blowing up a few feet of the pipe, a piece of which they carried away as a souvenir, but the damage was repaired the same day. At the time there were nearly a million gallons of water stored in reservoirs at El Mazar and El Arish, and there was, also, a good water supply in wells forward of the railhead. The pipe-line, although still vital, no longer had quite the same importance as when the advance across the waterless Sinai desert was being made. An appreciable rupture of the pipe-line during that period, combined with successful bombing attacks aimed at bursting the reservoirs, would have had the effect of stopping the advance, particularly in connexion with the actions at Maghaba and Rafah.²

*The Arab Revolt*³

[Map, p. 219]

Of the Arab princes who, under various measures of Turkish control, administered the fragments of an

¹ In a telegram to the Chief of the Imperial General Staff on April the 20th, Sir Archibald Murray stated: 'Counter-attacks have been easily 'beaten off, one entirely by our aircraft. . . .'

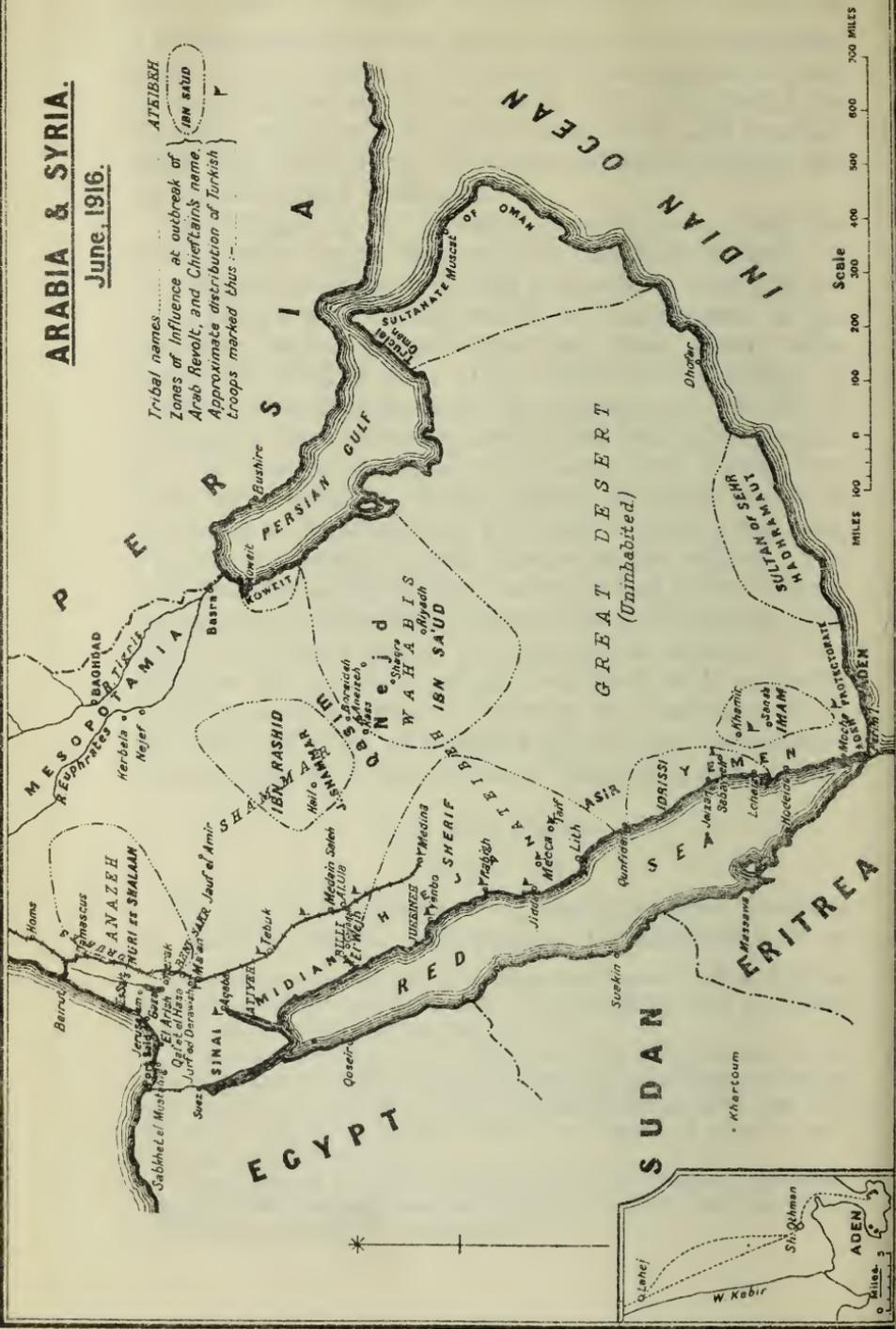
² The attack on the pipe-line was repeated by enemy aircraft on the 24th of May, when a part of the line was blown up near Salmana by officers who landed in an aeroplane. Repairs were made within three hours. On the 5th of August, in a similar attack, two lengths of pipe-line were damaged near the same place.

³ For a detailed account of the Arab revolt see *Military Operations, Egypt and Palestine* (MacMunn and Falls), Vols. I and II. Also *Seven Pillars of Wisdom*, by Colonel T. E. Lawrence.

ARABIA & SYRIA.

June, 1916.

Tribal names ATEIBEH
 Zones of influence at outbreak of Arab Revolt, and Chieftains name.
 Approximate distribution of Turkish troops marked thus :-



Arab Empire, the most important was the Grand Sherif of Mecca, Hussein Ibn Ali, who ruled the Hejaz and was guardian of Mecca and Medina, the chief Holy Cities of Islam. For years before the war unrest had troubled Arabia and many Arabs, dissatisfied with their position in the Ottoman Empire, dreamed of freedom and of a new Arab confederacy. The Sherif of Mecca was very friendly to Great Britain and his goodwill was diplomatically fostered. He had given a valuable indication of his friendliness when, following the Turkish declaration of a Holy War, he had refused to proclaim a *Jihad* from the Holy Cities. By the spring of 1916 British diplomacy, aided by Turkish repression, had brought the Grand Sherif to the point when he decided to take action to expel the Turks from Arab territories. The Arab rising began on the 5th of June 1916, and on the 28th British ships, loaded with two mountain batteries, six machine-guns, rifles, ammunition and stores, were in the port of Jidda.

Meanwhile, at 9 p.m. on June the 9th, a naval bombardment of the Turkish positions at Jidda had been opened. Two days earlier the *Ben-my-Chree* had arrived off Aden and her seaplanes had begun a series of bombing attacks on the Turkish positions in the Lahej delta. On the morning of the 15th of June the carrier reached Jidda and three of her seaplanes were sent away to reconnoitre, photograph, and bomb, the Turkish positions. Two pilots each dropped a 65-lb. bomb while the third dropped one of 112-lb. weight: the Turkish troops were also attacked by machine-gun fire from the seaplanes. Arrangements were made for the seaplanes to spot for the ships' fire on the following morning, but this proved unnecessary. News was received from Captain W. H. D. Boyle, R.N., the officer in command of the naval operation, on board the light cruiser *Fox*, that the Turkish forces in Jidda had surrendered, and to his signal he added: 'Probably the 'seaplanes decided the matter.' 'One may fairly claim', wrote Captain Wedgwood Benn, who took part in the operations as an air observer, 'the capture of this city, by 'no means an unimportant event of the war, as a decisive

'result secured almost wholly by aircraft.'¹ Although this may perhaps be going too far there seems little doubt that the resistance of the Turkish defenders, whose morale had already been undermined by the ships' bombardment, snapped when the seaplanes got to work. The capture of Jidda, with forty-five officers, 1,460 men, 16 guns, and useful stores, opened the way for supplies to be sent into the interior. After the fall of Jidda, the *Ben-my-Chree* returned to Port Said.

About three weeks later the weak Turkish garrison remaining in Mecca after the summer move of the Governor-General to Taif also surrendered. Taif itself held out until the 23rd of September 1916, after having been blockaded for about three and a half months by a mixed force of Bedouin and Meccan townfolk. By the end of September, indeed, the greater part of the Hejaz was clear of Turkish troops although the railway to Medina still remained intact in enemy hands.

There were, however, continuous rumours that Rabigh, on the best of the two routes from Medina to Mecca, might be seriously attacked by the enemy, and in October a Flight of aeroplanes of No. 14 Squadron was sent from Suez to Rabigh, together with a company of the Bedfordshire Regiment who were to act as an aerodrome guard. The combined detachment was, however, recalled before it could disembark at Rabigh because the presence of Christians seemed calculated to raise political and religious controversy which the Sherif of Mecca thought might hinder rather than help the Arab cause.

Growing Arab fears of a Turkish attack on Mecca by way of Rabigh, however, overcame the political or religious objections to British aeroplanes and, on the 13th of November, a Flight of six aeroplanes of No. 14 Squadron again embarked for Rabigh with a guard of about 600 Egyptian artillery and infantry. Three days later, with naval help, the aeroplanes were put ashore and an aerodrome was established. The possibility of an outburst of anti-Christian feeling had to be guarded against, and the mechanics did their work with rifles stacked ready for

¹ *In the Side-Shows*, pp. 98-9.

immediate use. The mere presence of the aeroplanes, once they began to fly on reconnaissance, had a tonic effect on the Arab forces, who had visual testimony of the unusual engines of war at the command of their Sherif.

On the 24th of November a praiseworthy attempt to cut the Hejaz railway was made by two Martinsyde pilots who flew direct from Mustabig in Sinai to Qal'at el Hasa, a journey which involved a five-hour flight covering about 350 miles. One pilot, Captain R. H. Freeman of No. 14 Squadron, attacked the railway bridge four miles south of Qal'at el Hasa with two 100-lb. delay-action bombs dropped from a height of 20 feet. One bomb struck the bridge, but bounced off and exploded underneath. The bridge remained intact, but part of the permanent way was damaged. The second pilot, Lieutenant S. K. Muir of No. 67 (Australian) Squadron, attacked Jurf ed Dera-wish railway station with one 100-lb. and four 20-lb. bombs, but scored no direct hits, although the bombs fell close to and damaged their objective. On the return journey, four 20-lb. bombs were dropped on a camp at Asluj, hitting tents. The visibility was phenomenal and, from one point, the whole of the Dead Sea, a strip of the Mediterranean, and a part of the Red Sea, were visible from the aeroplanes.

Early in December the Turks, who had been strongly reinforced, renewed their attacks and defeated the Arabs south-west of Medina. The enemy troops then established themselves in the hills half-way between Medina and Rabigh, with the two Arab armies, based respectively on Rabigh and Yenbo, separated. The Royal Flying Corps aeroplanes, operating both from Rabigh and Yenbo, reconnoitred the Turkish movements and photographed the enemy positions.

At one time it was feared that the Turkish advance seriously threatened both Rabigh and Yenbo. In the area of the latter port, indeed, the Turks pursued the Arabs to the hills bordering the coastal plain, no more than six miles from the town. When the position was critical, on the 10th and 11th of December, seaplanes from the

*Raven II*¹ flew over the Turkish advanced forces and attacked them with bombs and machine-gun, and these attacks, coupled with the presence of the British ships outside Yenbo, undoubtedly had some influence in inducing the Turks not to press their attack. With the arrival of Arab forces from the south and south-west, towards the end of 1916, the Turks again withdrew behind their line of fortified posts covering Medina.

On the 18th of January 1917 an Arab advance began along the coast with the object of capturing Wejh, 180 miles north-west of Yenbo, the fall of which would threaten the rear of the enemy forces in Medina, as well as the Hejaz railway. It had also been decided to land a small Arab force at Wejh, and on the 16th of January the *Anne* had gone to the Red Sea to co-operate with the naval forces. Preliminary seaplane reconnaissances down the coast satisfied the senior naval officer, Captain W. H. D. Boyle, R.N., that no Turks were marching south to reinforce the garrison in Wejh. The landing was made on the morning of the 23rd of January by a force of about 500 Arabs carried in the ships and by a naval landing party. The original intention had been to make the attack on Wejh in close co-operation with the Arabs advancing along the coast, but as time passed and the Arab force did not appear, Captain Boyle, anxious not to waste precious days during which the Turkish garrison might escape, had decided to attack with the few troops at his disposal. His attack had to be based on air photographs of Wejh which had been taken from seaplanes in December 1916, but before giving his final orders he flew over the port in one of the *Anne's* seaplanes and made a careful reconnaissance. Two of the bombarding ships, the *Fox* and *Hardinge*, were spotted for by two seaplanes, the range being indicated by smoke bombs and corrections being sent by wireless. An officer in one of the seaplanes,

¹ The *Anne* had left Port Said for the Red Sea on the 1st of September 1916, and for about two months her seaplanes had co-operated with the ships of the Red Sea patrol, chiefly by means of reconnaissance and photography and occasional bombing. The *Anne* was relieved by the *Raven II* in the Red Sea at the end of October.

Lieutenant N. W. Stewart, a Royal Flying Corps officer attached for observing duties, was killed by rifle-fire from the ground. One day's bombardment sufficed: the main body of the Turkish garrison slipped away from the port during the night and Wejh was occupied by naval and Arab forces on the morning of the 24th of January. The advanced guard of the Arab tribesmen who had marched along the coast to take Wejh came up with the Turkish fugitives on the morning of the 25th and captured many of them: only about one-third of the Turkish force which had garrisoned Wejh eventually escaped. The fall of the port marked the end of the co-operation of the *Anne* in the Arab revolt operations and the carrier returned to Port Said.

The Royal Flying Corps detachment continued to operate from Rabigh until March 1917, its main duties being reconnaissance and photography of the Turkish positions and of the approaches to Mecca from Medina. On the 5th of March a British aeroplane flew for the first time over Medina itself, and the observer made a reconnaissance of the Turkish dispositions and took photographs, but he dropped no bombs because of the city's sacred associations. Three enemy aeroplanes were seen in the air over Medina, but they made no attempt to attack the British reconnaissance aeroplane. On the 17th the Flight was transferred from Rabigh to Wejh, and from this base reconnaissances of and attacks on various points of the Hejaz railway were made: the aeroplanes used advanced landing-grounds for the more distant journeys.

These advanced landing-grounds were chosen by Royal Flying Corps personnel, and mixed detachments were sent out to do what was necessary in the way of road-making, clearing of the ground, &c.¹ An episode will serve to

¹ The Arab leaders also helped in the choice of likely sites. The war diary of the Rabigh Flight contains the following message, sent by Emir Ali to Major A. J. Ross, commanding the Flight, on the 2nd of March 1917: 'Respected Major Ross, we should prefer your coming out to us to inspect the spot we are about to select as an alighting place for the aeroplanes. Accordingly, have we sent to you Dakhil Bin Tallal and Atiya Bin Muheisin that you may set forth in their company to us. Moreover they have with them a trotting she-camel for your mount. We await you

illustrate the difficulties of this incidental work. On the 15th of June Second-Lieutenant W. G. Stafford left Wejh in a tender to supervise road making near a chosen landing-ground at Gayadah (the war diary records that the shade temperature on this day was 112°). It became known on the 22nd that Second-Lieutenant Stafford had left Gayadah three days earlier, by tender, with an air mechanic, to return to Wejh. Search was at once made for him, by air and by road, and the track of his car was eventually found on the 23rd. The track was followed for forty miles and the site of a camp was discovered with a note that the officer and his mechanic had finished their water and that they could not survive much longer. Later in the day the tender was found deserted and further search revealed no sign of the missing occupants. Both of them were, however, brought in to Wejh on the same day by Bedouin who had come upon them, in an exhausted condition, lying out on the hills.

The Gayadah landing-ground was prepared in connexion with a proposed Arab offensive against the Hejaz railway at Al Ula, an objective which was bombed from time to time by the aeroplanes. The military offensive against Al Ula was, however, abandoned in favour of a line-cutting expedition on a larger scale. The Royal Flying Corps detachment was instructed to bomb the Hejaz railway, and it moved to Gayadah, with three aeroplanes, on the 7th and 8th of July, whence Al Ula was bombed on the 11th, 12th, and 16th, when the station building and camps were hit. Sandstorms and rain made the work of the detachment difficult, and, in a severe storm on the afternoon of the 16th, the aeroplanes were so badly buffeted on the Gayadah landing-ground that they were rendered unfit for further active service. The Flight was thereupon recalled to Egypt for refit, and it left Wejh at the end of July, 1917, rejoining the parent squadron in Palestine on the 15th of August in time to take part in the Third Battle of Gaza.

'at Bir Abbas. Therefore start on the day this reaches you. Accept my warmest regards.'

CHAPTER IV

THE FALL OF JERUSALEM

Trench Warfare

[Maps, pp. 161, 209, and 239]

THE second Gaza failure was followed by six months of trench warfare, during which there were important changes in command and organization. Sir Archibald Murray had made it clear to the authorities at home that he would be unable to plan an effective invasion of Palestine unless he received reinforcements of two additional divisions, and after the Second Battle of Gaza he stated definitely that the strength of his forces precluded further offensive operations for the time being. The Government were anxious that the campaign should proceed and, although additional infantry divisions were not yet available, reinforcements of other arms, particularly of cavalry, were sent to Egypt. In June 1917 the 60th (London) Division was also transferred to Sinai from Salonika. The Government, however, decided that the new large-scale operations in Palestine should be directed by General Sir Edmund H. H. Allenby, and Sir Archibald Murray was so informed on the 11th of June. The new Commander-in-Chief arrived in Egypt on the 27th of June and took over the command two days later. He made a tour of inspection of the Sinai-Palestine front and conferred with his subordinate commanders, and as a result of what he saw and learned he cabled to London an appreciation of the situation on the 12th of July, and he set out his need for additional divisions (two), artillery, aircraft, &c. He proposed to reorganize the forces on the Palestine front to form two corps and one cavalry corps, all directly under general head-quarters, and he asked for three additional Royal Flying Corps squadrons. He would then be able to provide one squadron for each corps, one for general head-quarters, and also have at his disposal one fighting squadron; he asked that the aeroplanes should be of the latest type.

Brigadier-General W. G. H. Salmond had for some time

been pressing the director-general of military aeronautics to provide him with better fighting aircraft, and he had been informed on the 11th of July that the War Office had decided to raise a fighter squadron (No. 111) in Egypt. The personnel were to be provided from the forces in Egypt, but the War Office stated that equipment and transport would be sent from England. On receipt of General Allenby's cable of requirements the War Office further decided that an additional (corps) squadron—No. 113—should be raised in Egypt, to be equipped with R.E.8 aeroplanes from England. The third squadron asked for by General Allenby was not provided until February 1918.

In June 1917 the War Office had offered to send to Egypt two kite balloon sections if employment could be found for them. The offer had been accepted and, in August, the 21st Balloon Company (Sections 49 and 50) arrived and was attached to the Fifth Wing. In the same month 'C' Flight of No. 14 Squadron, which had been co-operating with the detachment in the Hejaz, arrived from Arabia and re-joined the parent squadron at Deir el Balah, where the whole of the Fifth Wing had been concentrated by the end of June.

The formation of No. 111 Squadron was not completed until September, but all three Flights had settled at Deir el Balah by the end of the month, No. 67 (Australian) Squadron having moved to a new aerodrome at Weli Sheikh Nuran on the 17th. On the 9th of September a special service Flight of No. 14 Squadron had left for Aqaba, where it operated under the administrative control of the Middle East, Royal Flying Corps, and ceased to form part of the Royal Flying Corps in Palestine.

No. 113 Squadron was formed at Ismailia. The first Flight arrived at Weli Sheikh Nuran on the 23rd of September, and the remainder of the squadron had reached the same aerodrome by the 10th of October. For better control of the air squadrons in the projected Palestine campaign a new command was formed on the 5th of October. This was the Palestine Brigade which included all Royal Flying Corps forces east of the Suez

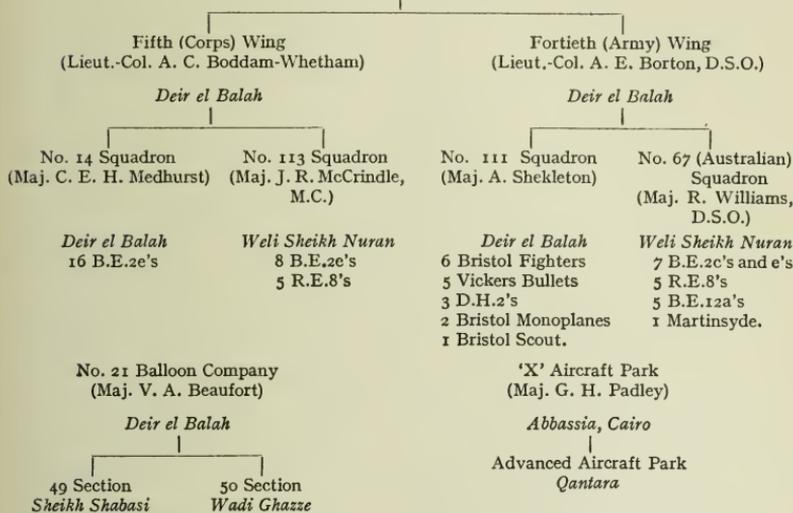
Canal and 'X' Aircraft Park situated at Cairo.¹ At the same time the Fifth Wing became a Corps Wing, and a new Army Wing—the Fortieth—was established. The Palestine operations began on the 27th of October and on that day the Palestine air command was as follows:

PALESTINE BRIGADE

Brigadier-General W. G. H. Salmond, D.S.O.
(G.O.C. Royal Flying Corps, Middle East).²

H.-Q. *Umm el Kelab*

Ad. H.-Q. *Deir el Balah*



¹ On the formation of the Palestine Brigade, the Middle East Brigade became Head-quarters, Royal Flying Corps, Middle East.

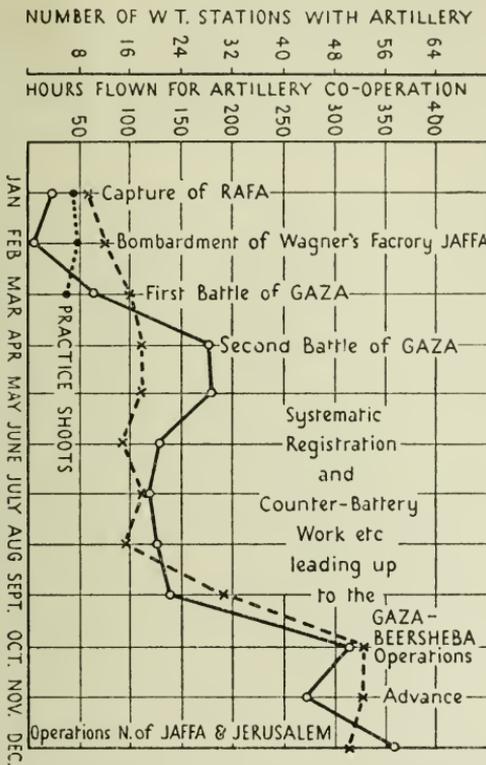
² On the 5th of November Brigadier-General Salmond returned to England on special duty and he was succeeded in Egypt and Palestine by Major-General W. S. Brancker. Early in December General Allenby recommended to the War Office a reorganization of the Royal Flying Corps command in the Middle East, in view of the great expansion of the air service. The head-quarters R.F.C., Middle East, should, he recommended, be raised to the status of a division under a Major-General, while the training group in Egypt, and the Palestine Brigade, should be decentralized as separate commands, each under a Brigadier-General. These recommendations were approved. Brigadier-General A. E. Borton took command of the Palestine Brigade on the 14th of December, and Brigadier-General P. L. W. Herbert of the Training Group. Brigadier-General Salmond returned to Egypt on the 3rd of January 1918 and took over command (as major-general) of the Royal Flying Corps, Middle East, from Major-General Brancker who went back to England.

During the six months of reorganization and preparation, the British forces on the Palestine front held the line occupied after the second battle of Gaza. The enemy meanwhile established himself strongly on the line from Gaza to Abu Hureira and worked steadily on its improvement and extension. He carried the Hureira defences south and east to Qawuqa and across the railway.

The most important work of the Royal Flying Corps during this period was photography. No detailed or accurate maps of southern Palestine existed, and it was necessary to map the whole area of projected operations. In October, when the advance began, more than 500 square miles of territory in Turkish possession had been photographed, and twenty sheets of a map to a scale of 1 : 20,000 had been published for the use of the army. Seventeen of these sheets had been compiled almost entirely from air photographs, while the others included much matter revealed by air photography. Apart from the work of mapping, photography was continuous for intelligence purposes. All enemy works were photographed at frequent intervals, and information about the Turkish battery positions was methodically compiled. Until the formation of the Palestine Brigade, the whole of the photographic work on the Sinai-Palestine front was done by the Fifth Wing photographic officer, Lieutenant H. Hamshaw-Thomas, and two small squadron sections. The difficulties which had to be overcome were many. There was always a shortage of material, water was strictly rationed, the dark room was an aeroplane case or tent usually insufferably hot, and the personnel had to work things out for themselves with no detailed guidance about the development of air photography in England and France. With the formation of the Palestine Brigade, however, matters improved greatly. The wing establishment was increased, two additional squadron sections were sent to Palestine, the supply of cameras, apparatus, and chemicals, became adequate, and huts were erected to serve as dark rooms and plotting rooms.¹

¹ The monthly output figures for 1917 reflect the increase in equipment, &c., after the Palestine Brigade was formed. For each month from January

Aeroplane wireless co-operation with the artillery also increased steadily. At the end of September the number of Royal Flying Corps wireless stations with the artillery was thirty-one and all available wireless personnel had been distributed. But as artillery reinforcements arrived for the offensive, there came additional demands for



Wireless Co-operation Chart, 1917
Palestine Brigade—Royal Flying Corps.

wireless stations, and the Royal Flying Corps therefore trained men transferred from various units in the army until, when active operations began in October, there were fifty-three stations in the field, fully equipped and manned. The 'Zone Call' system was introduced in

the figures were (a) negatives, (b) prints: (a) 277, (b) 2,493; 320, 2,880; 411, 2,557; 373, 3,286; 612, 4,200; 482, 2,594; 365, 2,702; 581, 6,432; 564, 8,469; 894, 21,126; 1,184, 14,714; 1,342, 24,113.

October.¹ The diagram shows graphically the growth in wireless stations throughout the year, and the hours flown in co-operation with the artillery.

The air work during the time of preparation was arduous. The B.E. type aeroplanes, owing to the heat and to the weight which they had to carry, especially when co-operating with the artillery, could seldom be induced to climb above 5,000 feet, and they made good targets for the numerous anti-aircraft gunners, especially in the Gaza area. They made good targets also for the much superior German aircraft, and fighting escorts had continuously to be provided.

Until the autumn of 1917 'contact patrol', or co-operation with troops on the ground, in the way in which it was practised in France, had not been known in Palestine, and an officer of experience in this activity was therefore sent to instruct the corps squadrons, in each of which a Flight was specially allotted for the work. Through the months of September and October, these Flights, in addition to their duties over the front, underwent an intensive training in co-operation with infantry and cavalry units which, apart from its technical advantages, led to a good understanding between the squadrons and the arms which they existed to serve.

The further operations in the air during the lull in the campaign may be briefly summarized. In addition to the photographic and artillery work already referred to, there were daily tactical and strategical reconnaissances and occasional bombing raids. By the end of May the Fifth Wing was in possession of two De Havilland Scouts, and in June there arrived some Vickers 'Bullets' and Bristol monoplanes. These fighters had some usefulness in that they made it a little more difficult for the enemy airmen to reconnoitre, except from great heights, but their very limited endurance prevented them from being used to escort the long distant strategical reconnaissance aeroplanes. In September, however, for the first time on the Palestine front, the Royal Flying Corps received aeroplanes which were as good as anything the German air

¹ For an explanation of the 'Zone Call' see Vol. II, pp. 175-6.

service possessed. They were Bristol Fighters, and although they were few they spread a feeling of exhilaration, not only among the squadrons, but also in the army. On the 7th of October, by which time there were five serviceable Bristol Fighters available, the first offensive patrol was made. Next day a German fighter was shot down within the British lines, the first enemy fighter to be captured on the Sinai-Palestine front. Another was shot down on the 18th and it may be said that before the Palestine operations began the Royal Flying Corps had, at long last, established local superiority over the enemy air service.

The bombing during these months of preparation was, in the main, conducted on the principle of returning to the enemy four bombs for each one dropped in the British lines. Two raids, of special interest, may be mentioned. It became known from agents' reports at the end of April 1917 that large quantities of stores had been accumulated by the enemy at Tul Karm. The Vice-Admiral of the East Indies and Egypt station was asked to organize a seaplane attack to bomb the railway and to destroy as many of the accumulated supplies as possible. Owing to a shortage of seaplanes, the raid could not be made until the 23rd of June when three Shorts from the carrier *Empress* dropped six 65-lb. and sixteen 16-lb. bombs. Two of the 65-lb. bombs fell in the station buildings and the others nearby. In co-operation with this attack, seven Royal Flying Corps aeroplanes bombed the German aerodrome at Er Ramle to distract the attention of the enemy pilots from the Tul Karm attack. Seventy-three bombs of 20-lb. or 16-lb. weight were dropped, some of which were seen to fall on the aerodrome. A feature of this minor operation was its perfect timing. At a conference between the Royal Naval Air Service and Royal Flying Corps officers it had been arranged that the bombing of the Ramle aerodrome should be made at intervals between 5 a.m. and 5.30 a.m. and that the naval seaplanes should attack Tul Karm and get clear again before the bombing of the aerodrome had ceased. One of the difficulties was that the *Empress* had to make her

rendezvous off a comparatively unknown coast, while the Royal Flying Corps aeroplanes had a long journey across Palestine to their objective. Everything, however, passed as planned and the naval bombing of Tul Karm coincided with the Royal Flying Corps attack on the Ramle aerodrome.

In the early morning of the 26th of June an attack by eight aeroplanes, four B.E.2e's (flown as single-seaters) and four Martinsydes, was made on a Turkish head-quarters camp at the Mount of Olives, outside Jerusalem, when two 112-lb. and forty-four 16-lb. bombs were dropped: four of the light-weight bombs struck the head-quarters buildings. The return journey was exciting. North of Beersheba the engine in one of the aeroplanes, a B.E.2e, failed and the pilot was forced to land. It had been arranged beforehand that if this happened another B.E.2e should land to rescue the pilot while a Martinsyde stood by to assist as necessary. Accordingly a second B.E. pilot landed and helped the first in an attempt to start the engine once more. This proved impossible and Very lights were then fired into the disabled aeroplane, but it failed to catch fire. While efforts were still being made to destroy the B.E., the Martinsyde pilot, anxious as a result of the delay, also landed, and by this time Bedouin were approaching and they opened fire on the group. The firing increased in volume and the Martinsyde, with the second B.E. carrying the pilot of the first, took off again hurriedly, leaving the derelict B.E. undestroyed. They had not gone far when the engine of the B.E. also failed, and a forced landing had to be made. It was now the turn of the Martinsyde pilot to go down to attempt a rescue, but when he had landed he found that he could not get off again even with only one of the stranded pilots, and finally the undercarriage of the Martinsyde was broken on the uneven ground. The guns, ammunition, and camera were taken from the derelict aeroplanes and buried in the sand, and the three pilots set out on foot in the hope that they would fall in with a British patrol. As luck had it, they were found by a light horse patrol in the afternoon.

Meanwhile matters had not gone well with the remainder of the original bombing formation. When the two B.E.'s had first landed north of Beersheba, followed by the Martinsyde, the remaining pilots had circled round ready to give assistance, until it was seen that two of the landed aeroplanes had flown off again. The time so consumed was twenty-five minutes and the result was that the two B.E.'s in the formation had insufficient petrol left to get home again. They, also, had to be landed, but at a spot which was outside the area normally patrolled by the Turks. Two of the three remaining Martinsyde pilots went down alongside, picked up the B.E. pilots, and carried them back to the aerodrome with the intention of obtaining a supply of petrol and of returning to salve the two B.E.'s. They reached the aerodrome safely and set off again without delay, but when they arrived over the stranded B.E.'s once more they found that a Turkish cavalry patrol had ridden up meanwhile and had already burnt one of the aeroplanes and partly destroyed the other.

The Third Battle of Gaza

[Maps, pp. 209 and 239]

At the beginning of October Sir Edmund Allenby was told that the Government desired Turkey to be eliminated from the war at a blow. If Turkey could be decisively beaten in Palestine, and the Jaffa-Jerusalem line captured by the British, it was considered likely that she would break with her Allies. The Commander-in-Chief thereupon issued his final plans for the attack. These plans are fully set out in the official military history,¹ but their main features must here be summarized to help the reader. The enemy positions ran from the sea at Gaza more or less along the Gaza-Beersheba road for thirty miles. Gaza itself, the key position, had, by this time, been made into a heavily entrenched fortress, but elsewhere the enemy held a series of strong supporting field works.

¹ *Military Operations, Egypt and Palestine*, by Captain Cyril Falls, Vol. II, Pt. I, Ch. II.

Lieutenant-General Sir Philip W. Chetwode, commanding the Eastern Force,¹ who had guided Sir Edmund Allenby when he made his plans, had pointed out that it would be fatal to take a half-bite at the cherry, that is, to make an offensive with forces which might be able to drive the Turks from the Gaza-Beersheba line, but would be insufficient to press on rapidly until the enemy had suffered a crushing blow. To attack Gaza would be to attack at the enemy's strongest point, and would once again mean a battle of siege warfare. It was unlikely that anything more than a local success could be achieved, or that the Turks could be prevented from taking up new positions. Merely to drive the enemy from one position to another was of no value.

The plan of operations allowed for an initial attack, in full strength, where the enemy was weakest, that is, on his left flank at Beersheba. It was an essential part of the plan that the town should be taken rapidly and by surprise in order that the Turkish command should not be allowed time to readjust its forces. With the fall of Beersheba water supplies would be made available and room would be given for the deployment of the attacking force, on the high ground to the north and north-west, for a further attack on the Hureira-Sheria line. With the Turks thrown into confusion by the surprise capture of Beersheba, and by the subsequent advance of mounted troops in a north-westerly direction against their communications, it was anticipated that Gaza could be assaulted with a prospect of quick success. The capture of Beersheba, therefore, was to be achieved in one day.

It was impossible to conceal from the enemy that offensive operations were being prepared, but it was necessary to make every effort to deceive him, up to the very last moment, into a belief that the main attack would take place at Gaza.

The efforts so made, in the result entirely successful, took various forms. To induce the Turkish command to believe that a landing on the northern coast of Syria

¹ Sir Philip Chetwode had taken command from Sir Charles Dobell on the 21st of April 1917.

would be made from Cyprus, sites for camps were laid out on the island and the garrison was instructed to show as much activity as possible. At the same time inquiries were made of local contractors about the provision of rations on a large scale, faked wireless messages were sent out, and reports were discreetly circulated that Cyprus was to be used as a base for secret operations. These somewhat elaborate attempts at deceit, however, did not succeed. The enemy command duly received news of activity at Cyprus, and of the rumours which were being passed, and they therefore sent a German aeroplane to reconnoitre the island on the 17th of October. The observer brought back a report which satisfied the enemy staff that no effective preparations for the reception of large bodies of troops had been made.

On the other hand, a simple ruse succeeded beyond expectation. A staff officer rode out into no-man's-land with a small escort early in October on a pseudo-reconnaissance. The party put themselves in the way of a Turkish cavalry patrol who opened fire, whereupon the staff officer pretended to be wounded and, making off with the Turks in close pursuit, he hastily dropped his haversack, freshly stained with blood from his horse. In the haversack were papers and personal articles, and among them was a faked report of a conference at British General Head-quarters indicating that the main attack would be made on Gaza with subsidiary flank operations by mounted troops against Beersheba, and that a landing would also be attempted north of Gaza. So cleverly had the documents been prepared that the Turkish staff, as has since been confirmed, was immediately deceived. It was subsequently noticed that work on trenches in the Beersheba area decreased appreciably while activity increased on the Turkish right. Although the Turks later received information which might have been expected to throw some doubt upon the view that Gaza would be the main front of attack, the idea had already become fixed and the new information was discounted.

Every possible precaution was taken to prevent useful air reports from reaching the Turkish command. The

German airmen, because they had disclosed the British intentions when Gaza had first been attacked, enjoyed a prestige which ensured that great attention would be paid to their reports. All British movements were made at night, the troops had orders to conceal themselves in the wadis by day and, wherever they were, to fling themselves face downwards and remain still if a whistle was sounded to give warning of the approach of enemy aeroplanes. For the important days, when the concentration against Beersheba was nearing completion, arrangements were made to prevent, if possible, any German aeroplane from getting through. Beginning on the 27th of October a defensive patrol by pairs of aeroplanes covered the line Gaza-Khelasa continuously from dawn to dusk. On the 30th, just after the British concentration had been completed, a German two-seater reconnoitring aeroplane, favoured by patches of cloud, eluded the fighter patrol and flew over the British back areas on the Beersheba flank. Photographs of the British dispositions were taken and many important visual observations were made, but when the German airmen, their task completed, were about to recross the lines, they were found by a patrolling Bristol Fighter (pilot, Captain A. H. Peck, observer, Captain J. J. Lloyd-Williams) and were shot down. The two Germans tried to escape from their damaged aeroplane, but they were wounded and were brought in as prisoners. Their photographic plates, marked maps, and notes, fell into British instead of Turkish hands, and the enemy command was thus robbed of material which must have led to a reconsideration of the British intentions, and probably also to a change in the dispositions made to meet the British offensive.

The orders issued to the Palestine Brigade, Royal Flying Corps, defined the areas for tactical and strategical reconnaissances. The tactical area of the XXI Corps covered Gaza and the defence systems to the south, and the tactical area of the XX Corps and of the Desert Mounted Corps covered Beersheba and extended north-westwards roughly to the Wadi esh Sheria. The area north of the Wadi esh Sheria and south of a line Kh. el

Rijm to about Tell en Nejile would, it was stated, be an army wing reconnaissance area during the first and second phases of the battle, but, after the capture of the Qawuqa line, would be included in the tactical area of the XX Corps and of the Desert Mounted Corps. The strategical area was divided into six sub-areas, each of which was to be reconnoitred two or three times daily from the opening of the operations, to provide information about enemy movements and concentrations. Photographs were to be taken of the Gaza defences daily, beginning four days before the assault, and a complete set of photographs to cover the Beersheba defences was to be procured two days before the attack on that town, in time for issue to the XX Corps and to the Desert Mounted Corps during the afternoon of the same day. A further series of photographs of Beersheba was to be taken on the day before the attack in order to reach the troops by 10 p.m., that is to say, with the latest information before the assault.

Operation orders issued to the Fifth (Corps) Wing were for co-operation with the artillery, contact patrols, and tactical reconnaissances. Those issued to the Fortieth (Army) Wing provided, in addition to strategical reconnaissance and photography, for special patrols to protect the corps aeroplanes against attacks by enemy aircraft, and to prevent the German air observers from reconnoitring the British movements.

As part of the plan to deceive the enemy about the area of attack, a bombardment, with naval co-operation,¹ was begun by the XXI Corps against the Gaza defences on the 27th of October. On the same day the Commander-in-Chief became anxious about his future air superiority. Reliable news reached him that the German air force on the Palestine front was about to be increased to five squadrons, and the information was that the reinforcing squadrons had already passed through Rayak on their way south.² His four Royal Flying Corps squadrons gave him a

¹ The naval bombardment began on the 29th, two days after the land bombardment. Seaplanes from the aircraft carriers *Empress*, *City of Oxford*, and *Raven II* co-operated with the ships. See pp. 419-22.

² Documents subsequently captured during the advance showed that

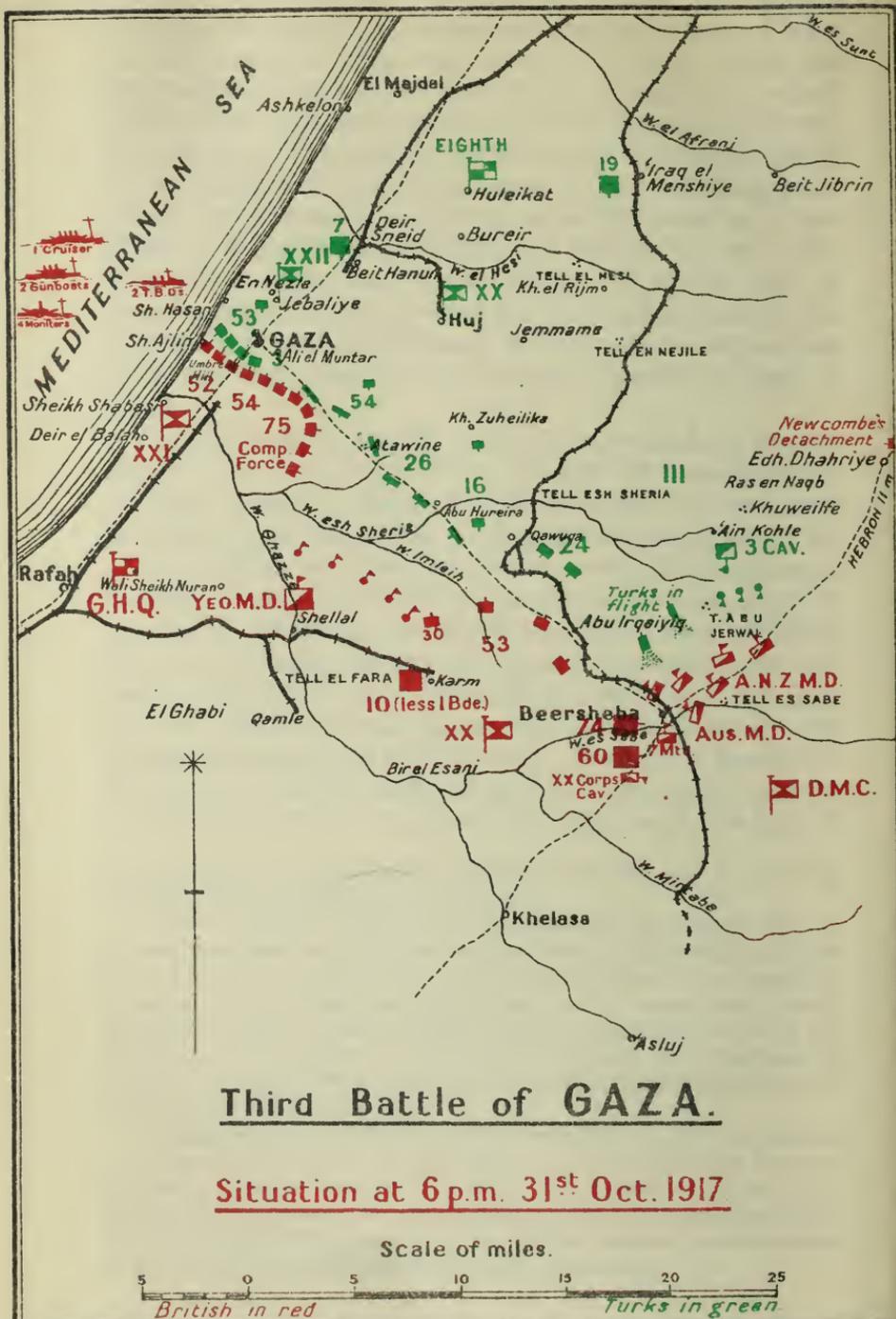
strength of seventy-two aeroplanes, many of them of poor performance, and if he was correctly informed about the impending increase in the German air strength, it seemed obvious that technical superiority would pass to the enemy. He therefore immediately cabled to the War Office asking for two additional squadrons, one of D.H.4 bombing aeroplanes, and the other a fighting squadron made up of one Flight of S.E.5's and two Flights of Bristol Fighters. The War Office reply was disappointing. It stated that as aeroplanes had to be provided for the Italian front it was impossible to send Sir Edmund Allenby the two squadrons asked for, but that his requirements would be kept in mind.

The air preparation for the attack reached its intense stage on the 27th of October, the day the bombardment at Gaza opened. From air photography it had been possible to publish, before the bombardment began, a list of 131 Turkish batteries, with notes, compiled from sound ranging, about the calibre of the guns. The list, kept up to date by the issue of supplements, gave a very complete idea of the enemy battery positions.¹ Aeroplane and balloon co-operation with the artillery, and with the ships off the coast, directed against the Turkish batteries and general defences, was continuous.² A surprise bombardment of the Turkish railhead at Beit Hanun was made by two 6-inch guns at a range of nine miles with the help of

during October 1917, the German squadrons, Nos. 301, 302, 303, and 304, arrived in Palestine with fifty-six aeroplanes.

¹ After the advance most of the emplacements were visited and comparisons were made with the lists compiled from air photography, supplemented by visual air reconnaissance. The lists were found to be remarkably accurate. In the Gaza area twenty-three out of twenty-nine battery positions had been accurately given, and in the Atawine area forty out of fifty-one. The positions which had not been located had been taken up during the battle and were outside the area which the Royal Flying Corps had been ordered to photograph.

² During the period October 27th to November 6th, the two balloon sections observed for 116 separate 'shoots', of which all except five were successful. Twenty-four were with ships. No. 49 Balloon Section had a direct telephone line to the naval signalling station on the coast from which the observations of fire, as given by the balloon observer, were converted to the naval code and signalled to the ships concerned.



the balloon observers. Strategical reconnaissances of the whole front and photography of specified areas proceeded smoothly. Tactical reconnaissances, especially important in the days preceding the attack, kept watch on enemy movements, on alterations and additions to trenches and wire, and on gun emplacements. No. 14 Squadron worked on the XXI Corps front and No. 113 Squadron for the XX Corps and for the Desert Mounted Corps.

The attack on Beersheba on the 31st of October met with an overwhelming success. The surprise proved to be complete and the town was captured the same day with 2,000 prisoners and thirteen guns. During the attack messages were dropped from the air stating the progress at intervals throughout the day; the number of tactical reconnaissance flights was fifteen. Six batteries which were active in the neighbourhood of Beersheba were reported from the air and five of them were silenced by the artillery with the help of air observation. Escorts for the artillery and contact patrol aeroplanes were provided by the Fortieth Army Wing, which was also responsible for patrols to keep off enemy aeroplanes,¹ for strategical reconnaissance, and for photography.

Following the fall of Beersheba, preparations were at once begun for an attack on the Qawuqa defences which covered Tel esh Sheria and Abu Hureira. Meanwhile, on the night of the 1st/2nd of November, an attack on Gaza was launched with the object of pinning down as many Turkish troops as possible on that part of the front. The first of the Gaza defence works to be assaulted was a position known as Umbrella Hill and it was arranged that two aeroplanes of No. 14 Squadron should attack active hostile batteries, during the advance, with bomb and machine-gun. The night was made brilliant by a full moon and the pilots and observers had no difficulty in picking out the landmarks in the Gaza area. They attacked batteries, revealed by their flashes to be active, and it is recorded that many of them were induced to cease fire, and even though this cessation was no more than tem-

¹ There were seven encounters with enemy aeroplanes in the four days from the 28th to 31st, but the hostile pilots retreated.

porary it was of some help to the attacking troops who duly captured their objectives. The battle at Gaza continued throughout the 2nd with appreciable success. There was a good example on this day of the fruits of anticipation. To cover the possible approach, once the battle began, of a Turkish reserve division (the 7th) known to be in Deir Sneid, the corps heavy artillery had been methodically registered for barrage fire with the help of air observation. On the morning of the 2nd large bodies of Turkish troops were seen advancing on Sheikh Hasan from the north-east, and the pre-arranged barrage was at once put down by the whole of the corps heavy artillery on a line of 3,000 yards, with the result that the enemy troops were scattered after suffering heavy casualties.

At dawn on the 6th of November the attack began on the important Qawuqa defence system. It was made by three infantry divisions, supported by yeomanry on their right, and a break-through was effected. The Turkish resistance was on the point of crumbling. Next day, the 7th, the centre of immediate interest shifted to the coastal sector where, for two days, there had been an intense bombardment by artillery of the XXI Corps and by ships off the coast, as a result of which the enemy had withdrawn a part of his forces. On the morning of the 7th the Imperial Service Cavalry Brigade passed through the deserted ruins of Gaza towards Beit Hanun. On the 8th there was a sweeping advance along the whole front and the Turkish troops were in precipitate and confused retreat.

Before the Turkish retreat began, all new enemy works discovered from the air were entered on maps of which photographs were taken: prints were distributed to the various commands either by air or by dispatch rider. The photographic section of No. 67 (Australian) Squadron was mainly responsible for this work, and with the help of a special staff at Weli Sheikh Nuran was able, throughout the battle, to provide the various army staffs with prints within four or five hours of the time that the plates were exposed over the Turkish lines. The artillery co-operation, both by the corps squadrons and the balloon sections, was

notable from the 1st to the 7th. During that week ninety-seven artillery flights were made by aeroplanes and 126 targets were engaged, fifty-nine of which were Turkish batteries. In the same period sixty-one targets were engaged with the help of balloon observation. Strategical reconnaissances by aeroplane observers of the Army Wing covered the main Turkish area.

The employment of the Royal Flying Corps for offensive operations against forces in retreat had been a subject for frequent discussion at air head-quarters. One of the advantages which the existence of training units in Egypt conferred on the general officer commanding the Royal Flying Corps in the Middle East was that he could, when judged desirable, draw upon those units to form an independent bombing reserve under his own hand. For the third battle of Gaza a Flight, called 'B' Flight, consisting of ten aeroplanes, B.E.2e's and B.E.12's, was especially formed from No. 23 Training Squadron in Egypt and, under the commander of that squadron, had arrived on the 30th of October at Weli Sheikh Nuran, where it remained until disbanded at the beginning of December.

It will be remembered that machine-gun fire from the air had been used against the enemy at Qatiya in April 1916, and again at El Fasher in Darfur during the campaign against Ali Dinar in May of the same year. Offensive action against ground troops was also a feature of the actions at Magdhaba and Rafah, but it was at the third battle of Gaza, with the formation of a special reserve bombing unit, that the offensive idea was given definite expression. From this time onwards to the end of the campaign the Royal Flying Corps developed more and more its offensive activities against troops on the ground.

In the afternoon of the 7th of November 1917, when the cavalry had already passed through Gaza, an air observer gave warning that Turkish troops in considerable numbers were hurriedly withdrawing along the roads running northwards through El Majdal and Beit Duras. The major part of the air service was promptly diverted to an offensive, with bomb and machine-gun, against the retreating enemy. A new German aerodrome at 'Iraq el Menshiye was twice

bombed on the 8th. During the first attack, by eighteen bombing aeroplanes with an escort of six, a hangar was set on fire and bombs were seen to explode among seven aeroplanes on the landing-ground: the railway station near the aerodrome was also bombed and hits were made on rolling-stock. In the second attack the station suffered more damage, and when later the place was captured it was discovered that the Germans had been compelled to burn aeroplanes and equipment which could not be transported: the charred remains of five aeroplanes were found. It is known also that three German aeroplanes were destroyed as a direct result of the bombing and that others were damaged.

There was an instance when a pilot who had lost his bearings made an attack on British troops whom he mistook for the enemy. There were other instances, happily rare, of a similar kind during the campaign. In fluctuating open warfare this was a danger which had constantly to be guarded against. Owing to the rapid expansion of the air services and to wastage in pilots and observers, it could not be avoided that important missions had sometimes to be entrusted to flying officers who had had little experience of active service conditions and whose training had been of a comparatively superficial kind. A civilian may be taught to drill and to fire a rifle or machine-gun and also learn discipline in a few weeks, but that will not turn him into a soldier equipped to deal with the emergencies of active service. A civilian may similarly be taught to pilot an aeroplane, to make simple routine observations from the air, or to handle a camera, but that is only a beginning. The air personnel who are called upon to work in co-operation with an army require to be highly trained. The ideal military air observer should, it may be said, be staff-trained. That ideal will never be possible in war when a nation has to raise a citizen army on the basis of a small volunteer service, but it is right to point out one among the limitations which such a method of making war must always entail.

After the bombing of their landing-ground at Menshiye on the 8th of November, the German airmen concentrated,

pending a further retirement, at an aerodrome at Et Tine, but they were given little peace. On the 9th of November a bombing attack (with a total of four 112-lb., four 100-lb., ninety-eight 20-lb., and twenty-two 16-lb., bombs) was made by twenty-two aeroplanes, with an escort of fighters, on the aerodrome at Et Tine and on the congestion of troops, transport, and material in the neighbourhood. This attack had remarkable results. When Et Tine was captured, three damaged aeroplanes, a damaged field gun, and many dead Turks were found, but these results were of minor importance in comparison with the moral effect of the bombing. Particulars are available from the German side and they merit study. Although the Turks had been streaming back in some confusion, they had revealed an underlying stubbornness, but the bombing attack on Et Tine caused a panic which spread its poison through the whole of the Turkish Eighth Army. The German commander Kress writes as follows: 'On the afternoon of the 9th of November there broke out a panic at Et Tine, the main ammunition depot and railhead behind the Eighth Army, among the large number of troops there assembled, transport columns and trains, mechanical transport, aircraft personnel. This did more to break the heart of the Eighth Army and to diminish its fighting strength than all the hard fighting that had gone before. Several bombing attacks by powerful enemy flying formations had caused explosions in the big dump of munitions at Et Tine, had cut all telegraphic and telephonic communication and created wild excitement, when suddenly news spread that hostile cavalry had broken through the main Turkish line and was moving against the head-quarters of the Eighth Army at Et Tine. Although this rumour was false and fantastic, it caused such agitation that many formations began to retreat without orders and broke into flight. A great number of officers and men could not be stopped till they had reached Jerusalem or Damascus. Baggage and supply columns, in particular, having lost touch with their troops and head-quarters staffs owing to the numerous changes in location of the latter in the course of the battle,

'fell into indescribable confusion. The results of the panic 'were especially serious, because not only had all telegraphic 'and' telephonic communication been destroyed, but 'almost all the horses of Army head-quarters had also 'stampeded, so that head-quarters was unable to send out 'orders to the troops. Thanks to the devotion and energy 'of a number of German and Turkish officers, order was 'in a measure restored the following day. But on the 'evening of the 9th the rumour spread in Jerusalem that 'the English had broken through our line and captured 'the head-quarters of the Eighth Army. As may easily be 'imagined this rumour caused considerable agitation in 'the city.'¹

This picture of the Turkish Eighth Army in retreat offers a good example of the power of the air weapon to create temporary panic and chaos of which the full fruits can be won only if the troops on the ground are in a position to strike quickly. As shall be told later in this history, the Turkish Seventh and Eighth Armies suffered a series of organized air attacks in September 1918, of which the British troops were able to take full advantage. The two Turkish armies were shattered and the maximum effects, moral and material, of air attacks were obtained because the British forces were already in pursuit of the defeated enemy and were in a position to exact full toll.

While the Turks were retreating, after the third battle of Gaza, all activity by the German pilots ceased. Bombed on their temporary aerodromes by the Royal Flying Corps, and harassed on the move by lack of transport, by the congestion of traffic, and by the general confusion, the German air squadrons suffered severely. The result was that the Royal Flying Corps pilots and observers flew at their will while the British advance was in no way subjected to hostile attention or attacks from the air. The effect on the Turkish Eighth Army of the bombing of Et Tine has been stated, but it should be pointed out that this attack was only one of a kind. From the 7th to the 14th of November, while the retreat was in progress, the air squadrons dropped about seven hundred

¹ *Zwischen Kaukasus und Sinai*, Vol. I, p. 51.

bombs, mostly of 20-lb. weight, on targets other than aerodromes. Notable raids were on Junction Station on the 10th and 12th, and on a troop train and a congestion of troops north of Lydda on the 14th. Air reconnaissances during the retreat, many of them made from a low height to draw Turkish fire in broken country which aided concealment, kept touch with the main enemy movements. The attack on Junction Station on the 10th, and on troops and rolling-stock in its neighbourhood, was made by thirteen aeroplanes, with escorts, and much destruction resulted, but there was also a secondary attack on the railway bridge over the Wadi es Sarar near the station, and although the attack was abortive, it deserves mention. If the bridge could be broken the two lines to Jerusalem and Beersheba would be cut off from the railway centre of Lydda, and the Turkish retreat would be impeded and much rolling-stock left derelict. Orders were given that two aeroplanes, each carrying two 112-lb. bombs, were to attack the bridge from a height of 500 feet or less. The attempt was made by Second Lieutenants H. I. Hanmer and H. L. C. McConnell. 'We decided', wrote the former pilot, 'to try and reach Junction Station before the high flying raid had stirred up the hornets' nest which, from reports, we knew must be assembled at the station. Difficulty in getting the bomb gear fixed, and then delay in adjusting the detonating gear, successfully prevented us from leaving until the other raid was well on its way. The detonation problem appeared at first insuperable: nobody in the squadron knew the correct procedure, but a young observer who had been in the artillery thought he knew and was allowed to carry on. Eventually, half an hour late, two B.E.'s struggled off the aerodrome with their bombs. Our plan of attack was that we should each have two runs at the target dropping a single bomb each time, and I was to make the first attack. Junction Station was fifty miles north of our line at Gaza and consequently all the country was new to us both, and the bridge was not easily located at first. As a result of the previous raid the Wadi Sarar was black with Turks seeking the only available shelter. We proceeded to carry out our task. None of the

'bombs exploded. McConnell was brought down a quarter of a mile from the bridge, was taken prisoner, and eventually died in Damascus of his wounds, and I was hit while making my second approach. I had a fortunate escape, for the bullet, after piercing a longeron and twisting my flying belt buckle in two, embedded itself in a corner of my cigarette case, causing a jagged end to be driven into my ribs.'

Meanwhile, General Allenby pursued the Turks as rapidly as his difficulties of supply would permit, and he proceeded to concentrate his forces for an attack on the important Junction Station where, according to the air reports, new lines of defence were hastily being made. The attack on the station took place on the 13th and 14th of November, and resulted in its capture with quantities of useful military stores and an unlimited water supply. The strategic result of the occupation of the station was the separation of the Turkish forces: the Eighth Army was in full retreat to the line Jaffa-Lyddā, while the XX Corps of the Seventh Army fell back to a position near Khulda, astride the Junction Station-Latron road. The pursuit continued: Ramle and Lydda were occupied on the morning of the 15th and Jaffa was taken at noon on the 16th. The Turkish Eighth Army, as reported from the air, eventually stood along a position behind the Nahr el Auja, while the Turkish Seventh Army assembled in the Judæan Hills to cover Jerusalem. General Allenby decided to contain the Turkish Eighth Army along the coast and to pursue and attack the Seventh Army in the hills, before it had time to reorganize, and thus open the way to the capture of Jerusalem.

Some of the Royal Flying Corps squadrons moved forward. On the 17th of November the advanced Flight of No. 14 Squadron went to an aerodrome at Julis and was followed by the remainder of the squadron three days later. No. 113 Squadron also moved to Julis, but by the end of the month No. 14 had gone on to Junction Station and No. 113 had sent a detached Flight to work with the Desert Corps head-quarters from Khirbet Deiran; the

remainder of the squadron moved to Deiran early in December. One Flight of No. 111 Squadron (Fortieth Wing) moved to Julis on the 27th of November and the remainder of the Wing had completed their moves to Julis by December the 13th. The balloon sections went forward to Saris and Lydda.

From the advanced aerodromes the aeroplanes of the corps squadrons daily reconnoitred the Turkish positions along the front. There was a little artillery co-operation with some of the few heavy guns which had been brought forward: the batteries laid out ground strips as signals to the air observers who dropped smoke bombs to indicate Turkish targets.

General Allenby moved forward slowly through difficult country towards the capture of Jerusalem. By the 21st of November the ridge called Nabi Samweil (ancient Mizpa), five miles from Jerusalem, was reached, but then came a series of Turkish counter-attacks which temporarily barred progress, and, for two weeks, while reliefs and guns were being brought forward and the water and transport supply was being reorganized, General Allenby held his hand. He decided, meanwhile, to bring up the forces which had been watching Hebron. They began to move on the 4th of December, occupied Hebron without opposition, and continued their advance towards Jerusalem.

From about the 24th of November enemy pilots again began to show themselves, and their aerodrome, discovered at Tul Karm on the 22nd of November, was therefore bombed by night and day on the 28th and 29th of November. The bombing attacks were made by No. 67 (Australian) Squadron and by 'B' Flight,¹ and during the two days one hundred 20-lb. bombs were dropped. On the 6th of December the observer in an aeroplane which had been making a strategical reconnaissance brought back news that 1,200 Turks were detraining at Qalqilye. Four Martinsydes were sent away at once with forty-four 20-lb. bombs and the pilots found a congestion of troops near the station; some of the bombs were seen to make direct hits.

¹ 'B' Flight was disbanded on the 6th of December 1917.

On the 7th of December the weather broke and there followed three days of rain. In spite of the rain, however, the main attack to capture Jerusalem was begun at dawn on the 8th, and by the evening the Turks had lost their hold on the city, in which, while the battle raged in the mists of the hills, there was confusion and panic. On the 9th the Turks were streaming away eastwards and by noon on that day British patrols were in Jerusalem. The Royal Flying Corps pilots, hampered by the weather, attacked the retreating Turks with bomb and machine-gun. No. 113 Squadron was water-logged on its aerodrome, but the commanding officer, Major J. R. McCrindle, had tarpaulins laid on the ground and he just managed to get into the air: he was able to make a reconnaissance, but had to land elsewhere on his return. No other aeroplanes of this squadron were allowed to go up for fear of crashing, as it would have been difficult to replace damaged aircraft. No. 14 Squadron was also water-logged, but the pilots, led by Captain F. A. Bates, contrived to get their aeroplanes off by man-handling them to the top of a small steep hill at the side of the aerodrome and giving them a flying start. In this way the squadron flew fifty hours on the 9th and dropped one hundred 20-lb. bombs on the demoralized Turkish troops.¹ One pilot of the squadron was forced to land at dusk in the hills north-west of Jerusalem. His aeroplane was undamaged, and after spending the night with a Bedouin family, one of whom helped to start the engine next morning, the pilot returned to his aerodrome carrying his volunteer Bedouin mechanic on the chance that he might have useful information to give through an interpreter. Other air attacks on the 9th were made by the Fortieth Wing squadrons, many of them with machine-gun fire from low heights. The attacks were maintained throughout the 10th, 11th, and 12th.

On Tuesday the 11th of December, General Allenby entered Jerusalem on foot by the Jaffa Gate and he was

¹ Subsequently, for about two months, the 'flying dive' down the hillside was a usual method of taking off. Men of the Egyptian Labour Corps were harnessed to the aeroplanes which they dragged to the hill-top.

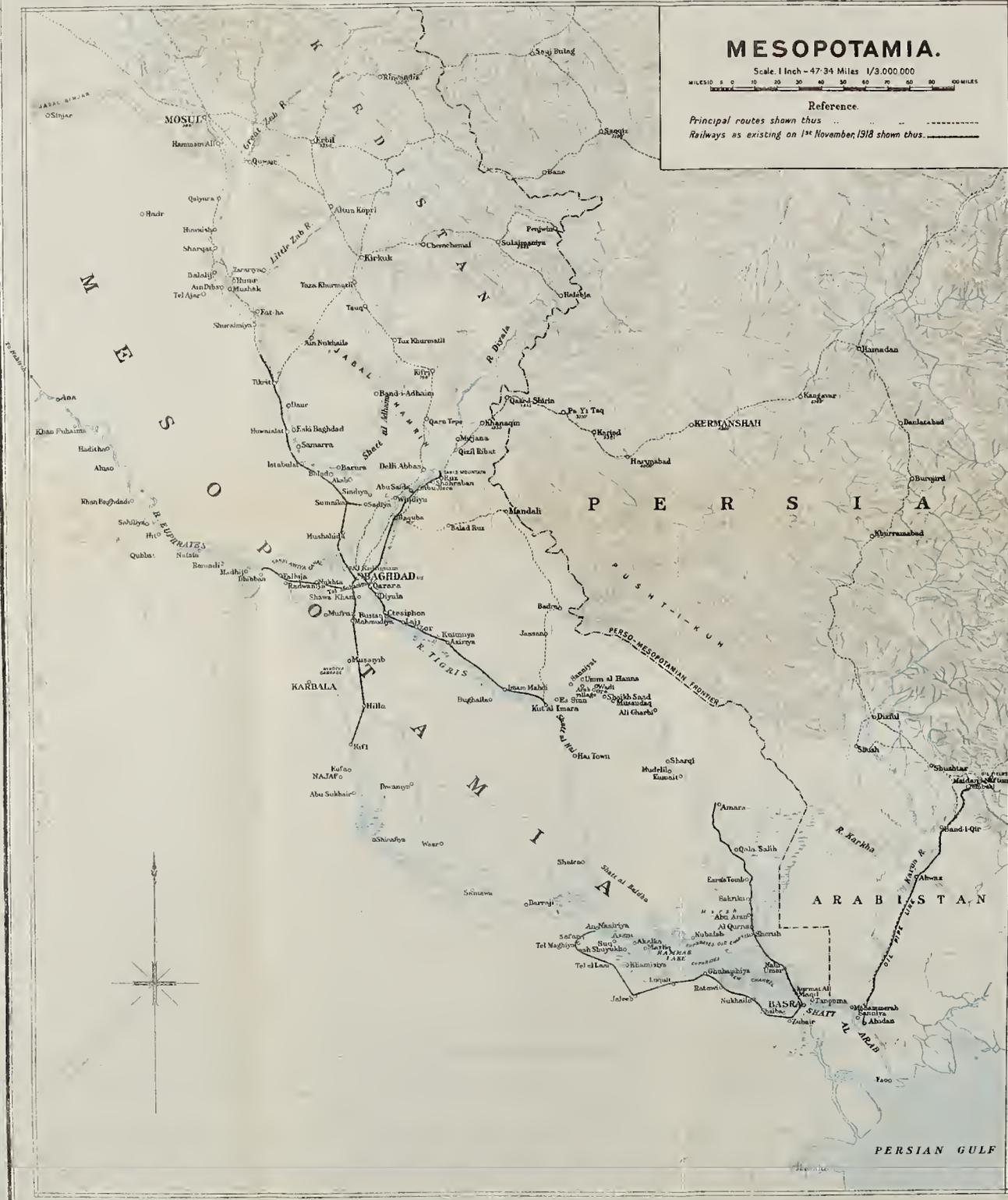
MESOPOTAMIA.

Scale 1 Inch = 47.34 Miles 1/3,000,000

MILES 0 10 20 30 40 50 60 70 80 90 100

Reference.

Principal routes shown thus
 Railways as existing on 1st November 1918 shown thus



conducted to the steps of the citadel, where the notables of the city awaited him. A proclamation was read, and after the chief inhabitants had been presented, the commander-in-chief passed out again the way he had come. The fall of Jerusalem marked a stage in the Palestine campaign. The Turks had been heavily defeated and the Turkish armies had been saved from destruction only by the difficult nature of the country. Twelve thousand prisoners and more than a hundred guns had been captured and the Turks had suffered further casualties of about 25,000, as compared with a total of 18,000 British (2,509 killed). Through the 3,000 odd years of its history Jerusalem has been repeatedly besieged and blockaded, and it is recorded that it has been captured or retaken from the invader thirty-four times. Following as it did on the fall of Mecca, the loss of the Holy City of Jerusalem was a blow to the prestige of Turkey which had repercussions throughout the world.

CHAPTER V

THE CAMPAIGN IN MESOPOTAMIA

1914—March 1918¹

[Map, p. 249]

THE territory which was the scene of the Mesopotamian campaign was known before the war as Turkish Arabia and included the three Turkish *vilayets* of Basra, Baghdad, and Mosul, with Baghdad as the capital and seat of government. Mesopotamia is a Greek word meaning 'between the rivers', and although generally understood in western countries as relating to the lowland regions of the basins of the Tigris and of the Euphrates, the name had no accepted geographical significance and was unknown to the inhabitants. That is why, after the war, the name disappeared and 'Irāq, the term in ordinary use by the natives of the country, was adopted. There is navigable access to the sea by the river Shatt al Arab, a fine waterway more than one hundred miles long formed by the mingled waters of the Tigris and Euphrates and thus carrying the drainage of the whole of Turkish Arabia as well as a large part of Persian Arabistan.

Sixty miles upstream from Fao, at the mouth of the Shatt al Arab, lies the emporium and port of Basra, inaccessible during the war to ships drawing more than nineteen feet of water owing to the existence of a bar outside Fao. Nor, in 1914, were there any quays or storehouses at Basra, and vessels had to be unloaded in mid-stream into native sailing craft called *mabailas*. Forty-six miles up-channel from Basra is Al Qurna, legendary site of the Garden of Eden, at the junction of the Tigris with the old channel of the Euphrates, and ninety miles above Qurna on the Tigris—the main line of communications between Baghdad and the sea—is Amara. One hundred and fifty miles beyond Amara is Kut, and another two hundred and twelve miles by river is Baghdad. Between Kut and Baghdad the river meanders greatly and the

¹ The student is referred also to the official history of the military operations, *The Campaign in Mesopotamia, 1914-1918*, by Brigadier-General F. J. Moberly, Vols. I to IV.

distance between the two places by land is no more than one hundred and twelve miles.

Navigation of the Tigris, confined to vessels of very shallow draught, is dependent upon the seasons of high and low water which are fairly well defined. November rains cause the first rise in the waters, and from January to March the rivers run fairly full. The melting of the snows in the Caucasus and in the highlands of Asia Minor, in March, leads to another rise, and during April and May the Tigris is at its highest. It falls in July and in August, and thence to November is at its lowest. In the rainy season between November and April, characterized by sudden violent storms, the soil in Lower Mesopotamia is converted into thick mud, hampering to all military movements. When dry, the ground was capable of supporting all except the heaviest military traffic. The season between May and October is a time of extreme heat with frequent sandstorms in the spring months, and a wind-storm, called the *Shamal*, which begins to blow about mid-June and blows intermittently for some forty days with a velocity up to forty miles an hour.

Before Turkey entered the war in October 1914 she gave evidence of her hostility to Great Britain, and among other acts she strengthened her forces in Lower Mesopotamia. At Abadan, on the Persian shore thirty miles from the mouth of the Shatt al Arab, are the installations of the Anglo-Persian Oil Company in which the British Government, because of the importance attached by the Admiralty to the oilfields, had become shareholders. On account of the known ambitions of Germany in this part of the world, and because of information that agents would attempt to raise a *Jihad*, or Holy War, in the countries lying between Mesopotamia and India, one effect of which would be to endanger the pipe-line from the oilfields to Abadan, it was decided, after consultation between the British Government and the Government in India, to send a force from India to the head of the Persian Gulf. The force, known as Indian Expeditionary Force 'D', and consisting of one Brigade, arrived at Bahrein Island from Bombay on the 23rd of October 1914, and

there anchored to await events. On the 31st of October news was received of the entry of Turkey into the war, and Brigadier-General W. S. Delamain, in temporary command of the force, was ordered to proceed at once to the Shatt al Arab to concert measures with the naval authorities for an attack on Fao. This was duly made on the 6th of November. The Fao garrison retired, after a short bombardment, and on the 7th the landing party, leaving one company to occupy the telegraph station, re-embarked and proceeded upstream. On the 8th and 10th they landed again and formed a camp at Sanniya, two and a half miles from the oil works, and there awaited reinforcements. Two additional Brigades and the 6th Divisional head-quarters arrived in the Shatt al Arab on the 14th of November and, after two minor actions in which the navy took part, Basra was taken on the 22nd. It was then decided to push on to Qurna and this town was occupied on the 9th of December, when 1,200 prisoners and 9 guns were captured. In January 1915, Turkish reinforcements were concentrated at An Nasiriya, on the Euphrates, for an attack on Basra. The attack, made by a mixed force of about 20,000, took place on the 14th of April and resulted in a sharp battle at Shaiba, west of Basra, in which the Turks were routed with heavy loss, after which the enemy retreated to Nasiriya.

The Government of India had meanwhile decided to reorganize the Mesopotamian expedition as an army corps under General Sir John E. Nixon, who had arrived at Basra from India with his staff on the 9th of April 1915. Accompanying him was Captain P. W. L. Broke-Smith, a Royal Flying Corps officer, whose duty was to make arrangements for the establishment of a base aerodrome and depot at Basra. Many urgent requests had been sent by Major-General Sir Arthur A. Barrett, commanding the 6th Division, for aeroplanes. He had pointed out, on the 9th of January 1915, that the rising of the waters, with consequent difficulties of navigation, had limited his powers of reconnoissance to a dangerous extent and that continuous rumours of Turkish reinforcements, coupled with Arab unrest, made adequate reconnoissance essential. It had,

however, been difficult for the Government of India to respond. On the outbreak of war India had sent to Egypt the only flying officers and material she possessed, and when she appealed to England, following the calls from Mesopotamia for aircraft, the reply was made that no help could be given: nor could Egypt surrender what had been lent to her. The Government of India thereupon turned to Australia and to New Zealand, and the response of those countries made possible the building up of an air detachment for early dispatch to Mesopotamia. New Zealand was able, as a beginning, to supply only one flying officer, Lieutenant W. W. A. Burn, but Australia already possessed the nucleus of a Flying Corps establishment and provided four trained pilots (Captains H. A. Petre and T. W. White, and Lieutenants G. P. Merz and W. H. Treloar), about fifty mechanics, complete workshop equipment, and mule transport. Both Australia and New Zealand offered to bear all expenses connected with their part of the detachment. The establishment for a Flight and for an Aircraft Park was completed by volunteers from Territorial battalions in India.

Captain Broke-Smith, after making himself acquainted with the conditions and requirements at Basra, returned to Bombay on the 17th of April to report and to organize a Flight from the personnel already assembled there. He re-embarked for Basra with part of the Flight on the 30th. England contrived to send two Maurice Farman aeroplanes (70 horse-power Renault engines) and, by the middle of May, the establishment of an aerodrome on an old Turkish camping ground at Tanouma, opposite Basra, was begun. By the end of the month a collection of miscellaneous stores, additional reinforcements, and two more Maurice Farmans (without engines) from Egypt, had arrived. The Maurice Farmans were old Longhorns which had seen much service as training aeroplanes in India; engines for them did not arrive until August.

The Advance to Kut al Imara

By the end of May 1915, preparations had been completed for an advance, assisted by naval sloops and armed

tugs, by the 6th Division, now commanded by Major-General C. V. F. Townshend, from Qurna on Amara. From a landing-ground at Sherish, near Qurna, the first air reconnaissance was made early on the 31st of May, the day the attack on the Turkish positions north of Qurna began. This first appearance of the air arm in the campaign was hailed with enthusiasm by the attacking troops as they toiled through the heat. The enemy camps and positions, and the amount of river transport available to the Turks, were reconnoitred as far as Sakrika, twelve miles from Qurna, and the information was plotted on a map. The observers (reconnaissances were made by the two available Maurice Farmans) also reported in person to the Army staff. The whole of the Turkish advanced positions were captured on the 31st, and, next morning, an air observer found that the enemy troops had abandoned the Abu Aran positions and were in full retreat. He scribbled a message giving this news and placed it in a can, with a streamer attached, which he dropped in the Tigris for Major-General Townshend's head-quarters in the sloop *Espiègle*. The message was retrieved and the pursuit was ordered. Air reconnaissances, made on the 2nd and 3rd of June from an advanced landing-ground at Abu Aran, kept touch with the retreating enemy, messages again being dropped in the river for the pursuing flotilla. Early on the 3rd, Major-General Townshend, who had transferred to the small river gun-boat *Comet*, called a temporary halt, twelve miles from Amara, but at about 9.45 a.m. the pursuit was resumed, and the armed launch *Shaitan* (Lieutenant Mark Singleton, R.N.) carrying Sir Percy Cox, the chief political officer,¹ was sent on well ahead to scout. When the *Shaitan* came in the straight reach of the river below Amara, enemy troops were seen crowding into a barge attached to a steamer on the right bank, but when a shot was fired by the *Shaitan* the Turks abandoned the barge and fled up the river bank on foot.

¹ Lieutenant-Colonel Sir Percy Z. Cox had been Foreign Secretary in India. His knowledge of the chiefs and of the politics of the Persian Gulf area was considered unique and he had been sent from India, with the original expeditionary force, to control all political matters.

White flags were observed flying over Amara, but the commander of the *Shaitan* did not stop to accept the surrender of the town. Instead he pushed on rapidly through the bridge and headed off the fleeing troops. On being overtaken, they indicated their surrender and Sir Percy Cox went ashore and disarmed them. Subsequently the Turkish prisoners, numbering 11 officers and 250 men, were forced to march back along the river bank to Amara. Major-General Townshend arrived in the *Comet* in due course and formally received the surrender of the town. During the night of the 3rd of June the telegraphic communications between Amara and Basra broke down, and urgent dispatches, together with maps, were conveyed to Amara next morning by aeroplane. It was established by air reconnaissances on the 5th that there were no formed bodies of Turkish troops within twenty-five miles of Amara. The British advance between the 31st of May and the 4th of June, made in a period of great heat, had been notably successful and had been achieved at a cost of 4 killed and 21 wounded, whereas the Turks lost 120 killed and wounded, and 1,773 prisoners, together with field and naval guns and many river craft sunk or captured.

On the 9th of June the air detachment moved to Amara and on the 14th a reconnaissance flight was made to Kut al Imara (123 miles from Amara) by Major H. L. Reilly (observer, Lieutenant W. W. A. Burn) who used an advanced refuelling base at Ali Gharbi, 60 miles from Amara. The *Shamal* was blowing and the visibility was poor, so that Major Reilly had to fly for the most part near the ground. The reconnaissance, however, was completed and a good report of the Turkish dispositions at Es Sinn and Kut was made. The sketch-map made by Major Reilly on this flight was amplified from time to time by subsequent reconnaissances and was used by Major-General Townshend when he planned his attack on Es Sinn in September.

After the fall of Amara, General Nixon decided, in spite of the sickness among his troops owing to the excessive heat, to capture Nasiriya on the Euphrates, where there

were, according to his estimates, about 5-7 Turkish battalions with a few guns. An air reconnaissance was made of the Hammar lake district on the 19th of June in one of the Maurice Farmans, but the aeroplane developed engine trouble on the return journey and was thereafter out of action. The second Maurice Farman, sent out to reconnoitre Nasiriya next day, also had engine trouble and became unserviceable. In July two 80 horse-power Gnome Caudrons arrived at Basra and they were at once sent up country, to Asani on the Euphrates, for reconnaissances of the Nasiriya positions. These were made on the 21st and 22nd, when the Turkish trenches were sketched from the air and the general positions plotted on a map. These reconnaissance reports gave Major-General G. F. Goringe, the attacking commander, his first comprehensive idea of the enemy dispositions and of the local topography. On the 22nd and 23rd, artillery fire was directed on the Turkish entrenchments from one of the Caudrons. At 5 a.m. on the 24th of July the British attack was launched along both banks of the Euphrates and, by 6.30 p.m., the Turks were in full retreat; Nasiriya was occupied on the 25th.¹

After further reconnaissances, which established the precipitate retreat of the Turks northwards, the two Caudrons were sent back to Basra on the 30th, but on the way both pilots had to make forced landings. One of the Caudrons eventually reached Basra, but the other never arrived and reports received a day or two later stated that an aeroplane had landed about twenty-five miles west of Ghubaishiya and had been attacked by Arabs. The two officers, Lieutenants G. P. Merz (Australian) and W. W. A. Burn (New Zealander), armed only with revolvers, kept up a running fight with the enemy and, it was said, killed and wounded some of the Arabs before they themselves died fighting side by side. A punitive expedition which was

¹ General Sir John Nixon, in his dispatch covering this operation says: 'I have to place on record the excellence of the work performed by officers and men of the Royal Flying Corps, whose valuable reconnaissances materially assisted in clearing up the situation before the battle of the 24th July.'

sent out found no trace of the dead officers, but the Caudron, hacked to pieces, was discovered a few days later. The Gnome rotary engines with which the Caudrons were fitted gave continual trouble because they were unsuited to a hot and dusty atmosphere. After this experience long flights between places on the lines of communication were forbidden until aeroplanes with more reliable engines should arrive.

Requests for more efficient aeroplanes had been made from the beginning of the campaign. On the 12th of June General Nixon had asked for adequate aircraft reinforcements, and the Viceroy had telegraphed a summary of the general's report to the India Office and had urged the provision of additional and better aeroplanes. At the end of the month a reply was received that the War Office had agreed to send to Mesopotamia two Flights of the Royal Flying Corps from Egypt. The British Government came to realize that India was in no position to equip and administer the air detachment in Mesopotamia and, early in August, decided that the War Office must assume full responsibility and that subsequent demands for aeroplanes, personnel, and material, should be made direct to England. On the 5th of August all officers on the strength of the air unit in Mesopotamia were gazetted to the Royal Flying Corps. The unit was to complete No. 30 Squadron which had originally been formed at Ismailia, Egypt, in March 1915. On the 26th of August four Martinsyde Scouts (80 horse-power Gnome engines) arrived at Basra as a nucleus for the equipment of a second Flight of the squadron, but it was not until the end of October that the third Flight, that is to say, the original Flight, with the squadron commander, Major S. D. Massy, arrived from Ismailia. It has already been said that the Gnome engine was unsuitable for work in the hot, dusty atmosphere of Mesopotamia, and the Martinsydes gave much trouble. At the beginning of September a Royal Naval Air Service seaplane Flight, under Squadron Commander R. Gordon, arrived at Basra from East Africa to co-operate with the naval forces in Mesopotamian waters. The Flight brought with it three 150 horse-

power Sunbeam Short seaplanes (equipped with wireless transmitting sets), but these proved unserviceable owing to poor climbing capabilities, and to the difficulty of getting an adequate seaplane run on the waters of the Tigris. It was not until their floats had been removed, and extemporized undercarriages substituted, that they could be used effectively. Two of them were converted for use as aeroplanes in October and, although the Sunbeam engines gave trouble, the Shorts did good work.

Meanwhile, on the 27th of July, the Viceroy had telegraphed to the Secretary of State for India saying: 'Now that Nasiriya has been occupied the occupation of Kut 'al Imara is considered by us to be a strategic necessity.' This further advance was eventually approved and General Nixon ordered Major-General Townshend to concentrate the 6th Division at Ali Gharbi for a movement up the Tigris to capture Kut. The concentration was complete by the 12th of September, the advanced Flight of No. 30 Squadron having arrived at Ali Gharbi from Amara on the 7th with two Martinsydes, a Caudron, and a Maurice Farman. The last-named aeroplane, however, was wrecked on landing, and another of the aeroplanes was wrecked a few days later.

The 6th Division began to move forward at dawn on the 13th of September and instructions were issued to the Royal Flying Corps to reconnoitre ahead as far as Shaikh Saad. This reconnaissance reported, by message-bag dropped at the head of the main column, that the way was clear of Turkish troops to Shaikh Saad which was occupied the same day. On the 14th Major Reilly reconnoitred as far as Kut, and he brought back information that the Turkish trenches on the right bank of the Tigris at Es Sinn appeared deserted and that no guns were visible in the emplacements. On the left bank there were extensive camps and there were many lighters and steamers in the river.¹

It was imperative that this information should be

¹ It was afterwards known that when Major Reilly's aeroplane was sighted, the Turkish troops at once went into covered trenches. The guns were also covered to conceal them from air observation.

checked because Major-General Townshend's strategy entirely depended upon his knowledge of the Turkish dispositions. A special reconnaissance by the naval flotilla was therefore ordered and it was reported, in consequence, that the Es Sinn positions were occupied by the Turks in full strength. Major-General Townshend still thought it desirable, before he issued his final orders for the attack, that the Turkish trenches and emplacements should be re-examined from the air. One of the two serviceable aeroplanes—the Caudron—which accordingly set out to make a reconnaissance on the morning of the 16th of September was shot down by rifle fire from the ground, but a second attempt in the evening, made by Major Reilly in the sole surviving aeroplane, was successful and the pilot's report and map showed that the enemy positions were elaborately organized and strongly held. In his book *My Campaign in Mesopotamia* (pp. 110-12), Major-General Townshend wrote: 'Major Reilly carried 'out the reconnaissance I had asked for, excellently well. 'He was supported by the gun-boats, and he brought 'back a very fine piece of work—a map and detailed 'information. The appearance of large numbers of tents 'indicated reinforcements. It was seen that the enemy's 'Torres-Vedras-like line of earthworks, entrenchments, and 'redoubts of the most modern type extended for twelve 'miles all told, on both banks of the river. . . . As soon as 'Reilly had completed his air reconnaissance and sketches 'I had ample and exact information. I issued Battle 'Instructions. . . .' Three days before the advance began, aircraft reinforcements arrived by lighter. They were two Martinsydes, which meant that three aeroplanes were now available, and there were, in addition, two naval seaplanes.

The attacking troops moved forward, in two columns, on the 26th of September from Sanniyat to within four miles of the Turkish positions, and the march was resumed next day on both banks of the river. On the morning of the 28th action was joined with the Turkish forces covering Kut. At 11 a.m. telephonic connexions between Major-General Townshend and the main British attacking column were broken owing to insufficiency of

cable, and throughout the remainder of the day the sole means of communication between head-quarters and this column was by air; visual signalling on the ground was impossible on account of dust, mirage, and the flat nature of the country. In the early morning one of the seaplane observers was able to send back corrections, by wireless, for the fire of a 5-inch howitzer battery which was bombarding the Turkish positions, but until the late afternoon it was impossible for the seaplanes to get into the air again because the direction of the wind did not permit of an adequate run along the Tigris.¹ At 5.30 p.m., however, both seaplanes were able to get away, and their crews reconnoitred the battle area and carried orders and maps to the forward naval flotilla.

From after darkness on the 28th of September, Major-General Townshend was without information about the progress of the main enveloping column until the morning of the 29th when an air observer brought back the news that the Turkish forces had, during the night, evacuated all their positions east of Kut and were in full retreat up the Tigris towards Baghdad. Kut was entered the same day and the Turks were pursued thence fifty miles up-river to Aziziya, which was reached by an advanced column of the 6th Division on the 3rd of October. The progress of the Turkish retreat was reported in some detail by the aeroplane and seaplane observers, who also discovered that the enemy halted with the apparent intention to make a stand at a prepared position astride the river at Ctesiphon. Major Reilly made a reconnaissance of this position on the 3rd of October and he reported that it was of a formidable kind, with six miles of entrenchments on the left bank of the river. By the 6th of October the aeroplane Flight, with its three serviceable aeroplanes, had moved to Aziziya. On this day the first reconnaissance of Baghdad was made in one of the Martinsydes by Captain H. A. Petre, who stated that he found the town nearly empty of troops.

The fall of Kut, which brought the whole of the Basra

¹ Both the Short seaplanes had been converted for use as aeroplanes by the 22nd of October.

vilayet under British control, marked the end of a stage in the campaign. The few aeroplanes available for the initial phase of the operations had exerted an influence out of proportion to their numbers. At Qurna, Amara, Nasiriya, and, above all, at Kut, the aeroplane reconnaissance reports had provided the material on which the military plans had been based, and the small air detachment must be accorded a share in the successes achieved. Apart from the climatic and other hardships of the country, common to all the troops, the air detachments had their own technical and transport difficulties to overcome. They had the use of a steamer and three barges. One of the barges, 100 feet long, was fitted with a platform deck and was employed, when towage could be obtained, to take aeroplanes up-river to the advanced Flight, and to carry damaged aircraft back to the Park for repair. One of the two smaller barges, both of which were 60 feet long, was fitted as a repair barge, with a power plant, and the other as a stores barge with a photographic dark room. The steamer was used almost entirely by the advanced Flight until after the occupation of Kut when, together with the 100 ft. barge, it became a supply depot at Kut, where an advanced section of the Aircraft Park was formed. The shallow reaches of the river above Kut could not be navigated by the steamer, and supplies for the Flight had to be sent forward by other vessels as opportunity offered.

The Battle of Ctesiphon

The arguments and correspondence which resulted in the decision to advance on Baghdad may be read in the official military history of the campaign.¹ During six weeks, subsequent to the fall of Kut, preparations for the attack on the Turkish positions at Ctesiphon, covering Baghdad, proceeded. In this period the long-awaited aircraft reinforcements arrived. They were four B.E.2c aeroplanes, four pilots, air mechanics, a complete repair section, mule transport, and much-wanted miscellaneous stores. The air units were in consequence reorganized as

¹ *The Campaign in Mesopotamia* by Brigadier-General F. J. Moberly, Vol. II, Ch. 13.

No. 30 Squadron and No. 4 Aircraft Park. The squadron was made up of two Flights, 'A' and 'B'. 'A' Flight consisted of the personnel and equipment on detachment at Aziziya, with the addition of three officers transferred from the Army to serve as observers. 'B' Flight went up-country from Basra with two B.E.2c's on towed lighters on the 9th of November. The aeroplanes were erected at Kut and were flown to Aziziya, where one of them was damaged on landing.

Aeroplane reconnaissances gave Major-General Townshend the only information obtainable about the Turkish defences at Ctesiphon. It was revealed that there were important inaccuracies in the existing maps of the Tigris, but owing to lack of equipment and personnel a photographic survey from the air was impossible, and simple instruments, to measure angles, were therefore fashioned by which the pilots and observers could make a rough survey by triangulation. The Maurice Farman aeroplane, which was slow and gave a wide field of view, proved a good medium for this work and, with the help of fine weather and clear visibility, the Royal Flying Corps produced a map, not only of the Ctesiphon defences, but also of the ground leading up to them, which proved valuable in the approach marches and during the battle.

On the 13th of November two officers set out in a Maurice Farman with orders to cut the telegraph wires west and north of Baghdad. The aeroplane landed on hard ground, and, before it could be brought to a standstill, hit a post and was damaged. The observer had succeeded in blowing up one telegraph post when fire was opened by Arabs. An attempt was thereupon made to get away, but the damaged aeroplane would not leave the ground and the two officers were eventually captured by the Arabs.¹ As a result of this loss, long reconnaissances were, for the time being, forbidden on the instructions of General Nixon.

By the 18th of November, Major-General Townshend had concentrated his forces at Kutuniya, and on the 20th

¹ The two officers, Captain T. W. White (pilot) and Captain F. Yeats-Brown (observer), afterwards escaped from captivity. See *Caught by the Turks* by Francis C. C. Yeats-Brown.

he began to advance on both banks of the river. Lajj, nine miles from Ctesiphon, was reached the same day, and four aeroplanes were thereupon flown to Lajj from Aziziya. Major-General Townshend asked for two air reconnaissances to be made next day, the 21st, one of Baghdad, and the other of the Ctesiphon positions. The longer reconnaissance was undertaken by Major Reilly, who failed to return, and the mishap which befell him was a prelude to the tragedy of Kut. His flight, of which it is now possible to reveal the details, calls for special attention. When Major Reilly was flying about four miles east of Ctesiphon his interest was caught by ominous alterations in the Turkish dispositions, and he soon realized that formidable reinforcements had arrived in the area. Impressed with the importance of his discovery he did not hesitate to abandon the Baghdad reconnaissance and to make, instead, a close and detailed examination of the whole Ctesiphon position. He had nearly completed his study when, by ill luck, a chance hit from a splinter of anti-aircraft shell put the engine in his Martinsyde out of action. The pilot glided into the desert, choosing a spot for landing as remote as possible from the enemy positions, and he set out on foot to reach the British lines. He was, however, hotly pursued by Arabs and eventually captured. A Turkish account of this episode says: 'An aeroplane . . . 'was brought down and captured by means of machine-gun 'fire from the 51st Division. . . . The presence of the 51st 'Division, which turned the balance of success against the 'British in this battle [Ctesiphon] was ascertained in this 'fruitless reconnaissance and was shown on the airman's 'map. But the map containing this priceless information 'fell, not into the hands of the enemy commander . . . 'but into those of the Turkish Commander . . . Major 'Reilly's greatest gift to us was a sketch showing the course 'of the Tigris from Diyala to Aziziya. This little sketch, 'probably of small account to the enemy, was an important 'map in the eyes of the Iraq Command. For at head- 'quarters and with the troops there was no such thing as 'a map. . . .'¹

¹ *The Battle of Suliman Pak*, by Staff Bimbashi Muhammad Amin,

Major-General Townshend might still have received information about the Turkish reinforcements from the special reconnaissance which, it will be recalled, he had ordered of the Ctesiphon positions. Unhappily the resulting air report did not indicate the changes which had taken place. The observer was one of the newly joined military officers who had had little opportunity to study the Turkish positions as they appeared from the air. He was, in other words, untrained in air observation, and the pity of it was that to him, and to none other, should be given an opportunity so rare and a responsibility so grave that the fate of thousands depended upon what he saw. The one shall be taken and the other left. Had Major Reilly been the officer who returned, Major-General Townshend would have known that his troops, on the morrow, would be called upon to face far superior enemy forces in well-prepared positions. It is possible that a withdrawal could not have been made without fighting, but it is reasonable to suppose that Major-General Townshend would never have persisted in his offensive had Major Reilly got back with his report,¹ and the consequences of such a decision would have been far-reaching: there might have been no siege of Kut.

On the morning of the 22nd the attack on Ctesiphon began and fighting was severe throughout the day. The only surviving Martinsyde aeroplane was lost through a forced landing in the Turkish lines as a result of engine failure, due to a hit from an anti-aircraft gun, but a converted Short seaplane and a Maurice Farman were flown over the enemy positions and the arrival of enemy reinforcements was noted. Turkish counter-attacks on the 22nd and again on the 23rd, made by superior numbers of comparatively fresh troops, left no doubt in the mind of Major-General Townshend that it was useless and dangerous to persist. The Turks had suffered heavily, but so had his published by the Turkish General Staff and privately translated for the Historical Section, Committee of Imperial Defence.

¹ The official military historian agrees with this supposition. He says: 'That General Nixon or General Townshend would have persisted in the 'projected attack against an entrenched position held by a force now so 'obviously superior in numbers seems improbable.' (*The Campaign in Mesopotamia*, Vol. II, p. 59.)

own force, which had had casualties of 4,500 (800 killed), about one-third of its attacking strength. It took the bitter and costly fighting of the 22nd and 23rd to make clear the numerical superiority of the Turks, which would have been realized before the battle began had Major Reilly's air reconnaissance report reached Major-General Townshend. Under cover of darkness on the 25th/26th the British marched back to Lajj, where a day to rest the troops was spent. By the 3rd of December the survivors of the force were back in Kut. While the retreat was in progress two converted Short seaplanes and two aeroplanes—all the available aircraft—kept watch on the oncoming Turkish columns, particularly for enveloping movements, and a few bombs of 100-lb. weight were dropped on massed Turkish cavalry and infantry. By the 30th of November the aeroplanes and the seaplane barge had arrived at Kut. Major S. D. Massy had also arrived there from Basra on the 28th to take command of No. 30 Squadron. Meanwhile, measures were taken to withstand a siege in Kut until the expected reinforcements from overseas should arrive to relieve the town. The seaplane Flight left for Basra on the 4th of December and the three aeroplanes that could fly were ordered away on the 6th. They left next morning, but one which had engine trouble had to land again at Kut. By that evening the Turks had closed in on the town from all sides and the siege had begun. There remained in Kut, of the Royal Flying Corps, five officers, the majority of the rank and file of 'A' and 'B' Flights of No. 30 Squadron, the lighters belonging to 'A' Flight, and three unserviceable aeroplanes (two B.E.2c's and one Martinsyde). The besieged in Kut were bombarded and attacked during December, but the Turkish divisions, after suffering heavy casualties in a series of assaults from the 23rd to the 25th, settled down to starve the British into surrender.

Attempts to relieve Kut

[Map, p. 249]

The decision to hold Kut until Major-General Townshend's force, totalling 11,607 British and Indian troops

with 3,530 followers, could be relieved, was not disputed by the British and Indian Governments. To effect the relief, a new force, called the 'Tigris Corps', was formed under Sir Fenton J. Aylmer, Adjutant-General of the Indian Army, to incorporate the remnants of the 12th (Indian) Division and two divisions (3rd Lahore and 7th Meerut) arriving piecemeal and incomplete from overseas. The 'Tigris Corps', hastily assembled, was ill-equipped for its formidable task, and because of the urgency of the need to relieve Kut was sent forward inadequately organized. Indeed, owing to lack of water-transport 12,000 of the reinforcements could not be moved forward from Basra.

The Tigris Corps began to assemble at Ali Gharbi. The loss of skilled personnel, of equipment, stores, and of three aeroplanes, shut up in Kut, crippled the Royal Flying Corps, which could only muster two aeroplanes at Ali Gharbi. They were a Maurice Farman and a B.E.2c, but the former was out of action, through overhaul, for some time, and up to the 4th of January, 1916, when the first attempt to relieve Kut began, Sir Fenton Aylmer had only one old B.E.2c to do all the reconnaissance work he required.

The leading troops of the 7th (Meerut) Division marched out from Ali Gharbi on the 4th of January for Shaikh Saad, where air reports indicated that there were strong Turkish forces. The attack on these forces began on the 7th and, two days later, the Turks, defeated, were in retreat. The air observers, hindered by bad weather, had reported a part of the progress of the battle, and they followed the retreating enemy troops and noted that they took up a fresh line of resistance at Ora, where they had the protection of a wadi: a sketch of the new position was made from the air.

The Kut relieving force followed the Turks and, on the 13th, with the co-operation of naval gunboats, attacked the Ora positions, which the enemy troops evacuated during the night and next morning. Air reconnaissance reports made it clear that the Turks had fallen back no more than three miles to the Umm

al Hanna lines, between marsh and river. A rough sketch of these lines was made from the air, but subsequent bad weather prevented the observers from supplementing such incomplete information as they had been able to obtain when the Turks took up the position. The Umm al Hanna lines were attacked on the 21st, but the assault failed and the British troops withdrew to an entrenched position, about 1,300 yards from that of the enemy, and there settled down for about a month to the stagnation of trench warfare.

The operations had been greatly hampered by the weather. Soon after the attack on Shaikh Saad had begun, the rains had set in. High winds and perverse currents in the rapidly rising Tigris made river navigation difficult, while the thick mud to which the soil was churned made the progress of the troops on land laborious. The Royal Flying Corps detachment suffered particularly as it moved forward with the advancing troops from Ali Gharbi to Musandaq, to Shaikh Saad, and then to Ora, where the detachment arrived and settled on the 16th of January. There was no time or opportunity during the advance to prepare landing-grounds, and the two available aeroplanes had to lie out in the open in wind and rain. Nor did the mud make it easy for the aeroplanes to get off or land. Although, in spite of the difficulties, reconnaissances were made and the general dispositions of the Turks were reported and sketched, there is no doubt that the attacking troops were severely handicapped by the incomplete nature of the information available to them.

During most of February, while the preparations were being made for a resumption of the offensive, there was only one aeroplane serviceable, but daily reconnaissances enabled the air observers to watch the construction and progress of new Turkish positions behind the Umm al Hanna lines. In a telegram on the 26th of February to the Army Commander,¹ Lieutenant-General Aylmer said: 'I must confess that I have been disappointed

¹ Lieutenant-General Sir Percy H. N. Lake, the Chief of the General Staff, India, had succeeded General Nixon in command on the 19th of January, 1916.

‘with the action of the Cavalry Brigade on the whole. ‘Though an absolutely flat country like this, with no ‘cover, where every movement not only of a cavalry mass ‘but of a patrol can be seen at many miles, certainly does ‘not give a Cavalry Brigade much chance of distinction, ‘the Turkish regular Cavalry has certainly suffered in the ‘same way. I have, perhaps, not called on my cavalry to ‘push home reconnaissances regardless of loss as aerial ‘observation has generally been available and is better.’

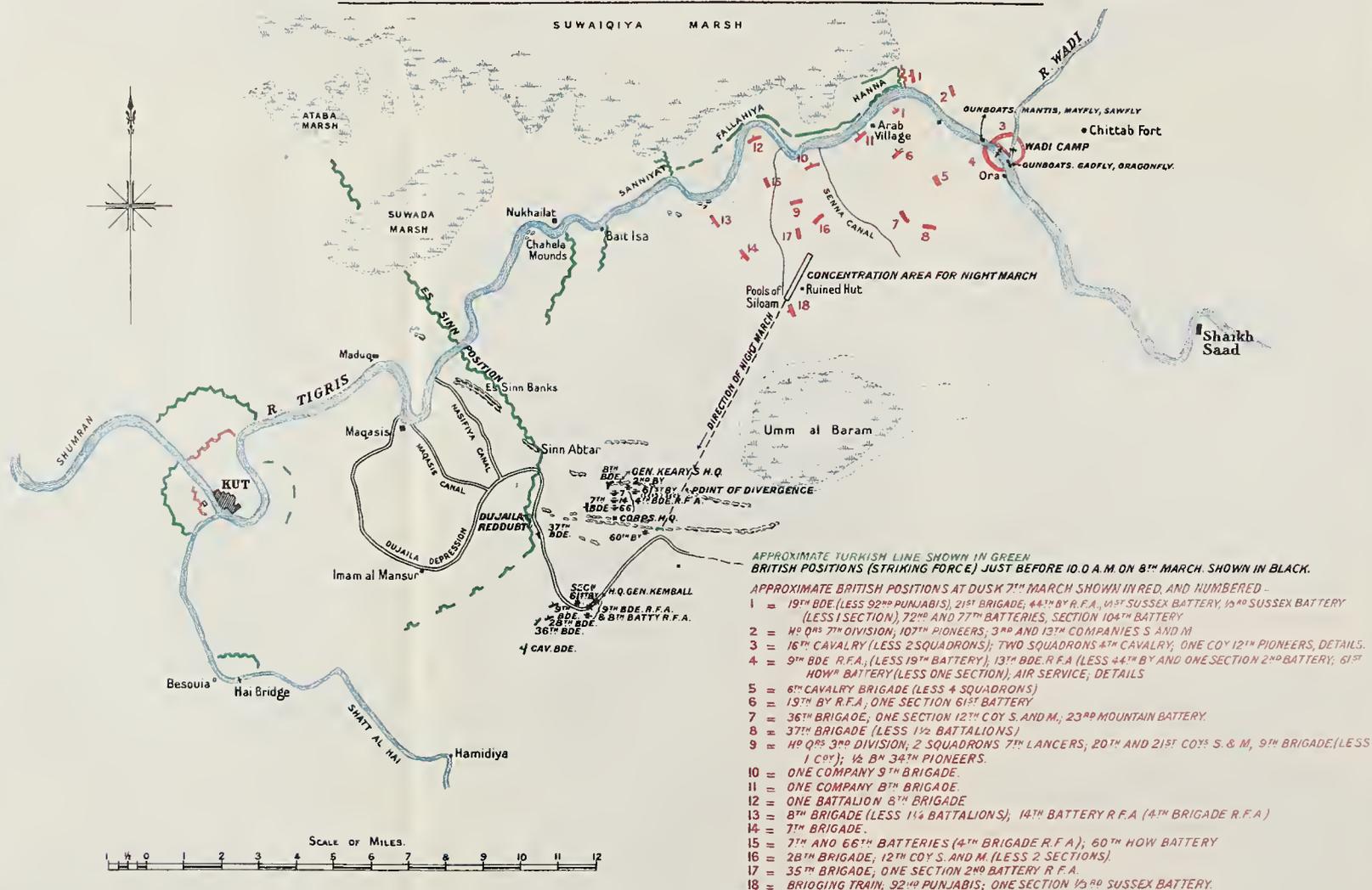
Aircraft reinforcements had been sent forward to Lieutenant-General Aylmer from Basra, but they had had ill luck. It will be recalled that the two naval Shorts had gone to Basra for refit at the beginning of December 1915. On the 17th of January 1916 there arrived at the port additional aeroplanes for the Royal Naval Air Service, namely, two 140 horse-power Voisin biplanes. The Royal Naval Air Service unit had the aeroplanes, but was short of pilots, while the Royal Flying Corps had the pilots but no aeroplanes for them. It was decided, therefore, to combine in a composite Flight for temporary duty with the Tigris Corps. No tug was available to tow the stores barge upstream until the 31st of January, when the move from Basra was begun, the aeroplanes going by air. One Short and one Voisin were wrecked on the way and only two aeroplanes survived the journey to Ora, which was reached on the 2nd of February, the stores barge arriving two days later. With the arrival of the naval aeroplanes, one of the two Royal Flying Corps aeroplanes, much the worse for wear, was sent down to Basra for refit. Unhappily the ill luck which had dogged the Composite Flight continued. The one Short was damaged in a bad landing on the 4th of February and the Voisin, after making three reconnaissance flights, was forced down by engine trouble on the 8th and was bogged for ten days. Another Short which arrived on the 14th turned over on landing and was wrecked.

In February, however, additional aircraft reinforcements reached Mesopotamia. They were two steel Henri Farmans (140 horse-power Canton Unné engines)¹ and

¹ These all-steel aeroplanes proved extremely satisfactory, and they and



MAP TO ILLUSTRATE THE ATTACK ON THE DUJAILA REDOUBT: 8TH MARCH, 1916.



five Short seaplanes (225 horse-power Sunbeam engines) for the Royal Naval Air Service and four B.E.2c's for the Royal Flying Corps. Meanwhile, by arrangement between the War Office and the Admiralty, it had been decided that the Royal Naval Air Service detachment should be placed under the orders of the G.O.C. in Mesopotamia, and that the military authorities should assume full responsibility for all administration, transport, and repair, in connexion with the naval flight. Accordingly, on the 28th of February, orders were issued stating that the Royal Flying Corps and Royal Naval Air Service detachments would be administered as one service under army orders, and would be commanded by Wing Commander R. Gordon.¹ The two Henri Farmans were flown to Ora at the end of February, and two of the four B.E.2c's on the 5th and 6th of March. On the 8th 'A' Flight personnel, who had been sent from the front to Basra to refit, arrived back at Ora with a workshop lighter carrying the remaining two B.E.2c's, two Lewis guns, wireless sets, cameras, photographic equipment, bombs, and general stores.

Meanwhile, the Turks had also been reinforced, from the Dardanelles, by a German aeroplane unit which included some Fokker single-seater fighters. On the 13th of February the first enemy bombs were dropped on the besieged in Kut, and thereafter there were many sporadic bombing attacks which inflicted no great material damage but sadly affected the morale of the civilian population in the town. The enemy aerodrome was located at Shumran Bend, within sight of the Kut defenders, and Major-General Townshend arranged to give warning, by wireless, whenever enemy pilots left the ground in order that aeroplanes of No. 30 Squadron might be sent up to attack. There were, however, no British aeroplanes available capable of standing up to the Fokker. Indeed, as has been told, there was, for a long time, only one serviceable aeroplane with the forward troops. On the 5th of March one of the

their engines stood up to the climate well, as they did in the campaigns in German South-West and East Africa. See Vol. III, Ch. I.

¹ Major P. W. L. Broke-Smith became staff officer for aviation to act as technical adviser at General Head-quarters on all aeronautical matters.

Voisins was shot down, and a message dropped by a German pilot next day stated that the two officers had been killed; *C'est le sort des aviateurs, c'est la guerre*, the message concluded. The observer in the Voisin, Captain W. G. Palmer, had been the first officer to be trained as a pilot in Mesopotamia.¹ He was a staff college graduate, and the air reports he had made of the Turkish defences had often been the subject of special tribute in the military intelligence diaries.

The Attack on the Dujaila Redoubt

[Map, p. 269]

The main Turkish defence system covering Kut on the right bank of the Tigris was the Es Sinn position. If this could be turned the way to Kut would be open, and the chances were that, immediately the Turks knew the position had been turned, they would evacuate their defences on both banks of the river below Kut.² The key to the Es Sinn position was the Dujaila Redoubt on its right flank, some fourteen miles south-west of the British lines on the same side of the river. Lieutenant-General Aylmer decided on a bold strategic move. There was reliable information that the water supply in the Dujaila area was meagre and that, in consequence, a majority of the troops detailed to garrison the redoubt were normally encamped some five miles distant, by the banks of the Tigris. Lieutenant-General Aylmer's plan was to move a superior force, under cover of darkness, across the Turkish front to attack the Dujaila positions and carry them by assault before reinforcements could arrive: the operation was to begin on the 7th of March.

¹ A training school had been established at Basra in September 1915, under orders of the Government of India that pilots must be trained in Mesopotamia. The order was cancelled in 1916, when the War Office took over the responsibility for the air detachment in Mesopotamia.

² There is much evidence to support this statement, and the reader might usefully refer to the account of the action in the official military history, *Mesopotamia Campaign*, Vol. II, pp. 314-49. It should be borne in mind that the Turks, who were admittedly in a difficult position, had to reckon with the possibility that the Kut garrison would make a sortie to attack the rear of their defences.

It will be observed that surprise and time were the elements on which success depended. The undertaking was sufficiently formidable. It meant the movement of 20,000 men, with their impedimenta, for distances ranging up to 16 miles. A night march of this kind, through strange country, called for perfect march discipline and for expert and detailed staff work, more particularly as the attack was to follow immediately the march was completed.

It was calculated that if the troops were assembled to leave their rendezvous at 9 p.m. on the 7th of March, they would reach their objective by dawn, about 5.45 a.m., on the 8th, a calculation which allowed a margin of one hour for unforeseen delays. The march represented a distance of from 12 to 16 miles, and some of the formations taking part had already been on the move the night before. Furthermore, the force was a mixed one, of British and Indian troops, and this had some effect on march discipline, while the staff work, mainly because of a deficiency in staff training, did not always reach the exacting standard which the operation demanded.

There were initial delays and some of the troops, particularly the artillery, arrived late at the rendezvous, with the result that the start could not take place until 10.22 p.m., so that the margin of one hour allowed to cover the whole operation was more than consumed before it began. There were other delays on the march, and an hour after dawn the troops, already weary, were still a mile or more short of their objective.

It has been asserted that because the marching columns were thus overtaken by daylight, with still a long way to go, the operation was doomed to failure. This is untrue. The Turks had no reason to suspect an attack against the Dujaila Redoubt and there was little fear of early discovery from the air. Owing to the length of shadow cast by the morning sun close observation from above was difficult at this time of the year until after 8 a.m., and as it was necessary for both sides to make the most of their slender resources in aeroplanes it was not usual for air reconnaissances to be made until the visibility ensured adequate

observation. So far, therefore, as enemy aeroplanes were concerned, the commander of the attacking force could justifiably assume that he would be reasonably safe from detection until about 8 a.m. He might, indeed, have extended this hour until 9 a.m. without being unduly optimistic.

The element of surprise was exploded by the artillery. It seemed to Lieutenant-General Aylmer, who had taken up his head-quarters on a mound which gave a fair view of the battle-field, that the Turks could not have failed to see, from their redoubts, at least some of the British movements, and as he had received a message which led him to believe that the British infantry would shortly be ready to attack, he ordered the corps artillery to open fire. This they did at 7 a.m. against a camp of Turkish cavalry and Arab irregulars south-west of the Dujaila Redoubt, and all the Turkish defenders in the area were at once startled into alertness. It is known that this was the first intimation the Turks received that an attack was imminent, and that the Turkish defensive movements were at once set in train.

The British infantry were not, in fact, ready to go forward until long after the artillery opened fire. The main body was being formed for the attack in the Dujaila depression, a process which consumed precious hours. Troops, transport, artillery, and ambulance wagons had to be sorted out within a strictly limited space, a task made more difficult because of the tiredness of men and animals. In the result it was not until 9.35 a.m. that the infantry began their forward march to the assault.

The importance of the delay will be clear if we consider the Turkish dispositions and movements. In advanced positions at Bait Isa and Chahela, on the Tigris, covering the Es Sinn defences, was a regiment (1,000 rifles) of the *35th Division* with the remaining two regiments (2,000 rifles) of the division holding the Es Sinn line from the Tigris as far as and including the Dujaila Redoubt. Originally guarding the right flank of the redoubt were Arab irregulars and a part of the Turkish cavalry brigade, but when the British artillery had opened on them at

7 a.m. they had fled, thus leaving the flank open. In the Dujaila area, but some distance behind the redoubt, were four battalions of the *2nd Division* (1st and 5th Regiments), while at and near the Hai bridge were three more battalions of this division. Across the Tigris on the left bank, available for reinforcing the Es Sinn defences, was the *51st Division* (4,000 rifles). On the same side of the river, investing Kut, was the *45th Division* (3,000 rifles). The forward defence systems on the left bank, at Hanna and Sanniyat, were held by the *52nd Division* (4,000 rifles).

As soon as the alarm was raised orders were given for the Turkish troops in the advanced positions at Bait Isa and Chahela to withdraw and move across to strengthen the right flank about Dujaila. The battalions of the *2nd Division* were also ordered to Dujaila, while the *51st Division* was set on the move by ferry across the Tigris at Maqasis.

The first British reconnaissance aeroplane left Ora at 7.43 a.m. and the pilot landed again at 8.58 a.m. He had flown as far as the Shumran Bend and his observer had examined both banks of the river. The air report had little to tell. A camp had been struck at Shumran and the troops were lined up nearby. In the important area, at Dujaila, some four hundred Turkish infantry were seen moving along trenches south-west of the redoubt, but otherwise no activity was noted. The next aeroplane, however, which had set out at 7.48 a.m., came back at 9.15 a.m. with important information. At 8.30 a.m. the observer had seen tents being struck in the camp at the Maqasis canal and, fifteen minutes later, in the same area, had discovered eighteen Turkish companies moving towards the lightly held Dujaila Redoubt, with the head of the column some three miles west-north-west of the redoubt. This column was, it can now be stated, made up of the four battalions of the Turkish *2nd Division* together with two machine-gun and engineer companies. A later air reconnaissance, made from 10.50 a.m. to 12.25 p.m., discovered the movement of the *51st Division* across the Tigris at Maqasis. A part of this division, according to the observer's report, was already across the river at 11.15 a.m.

and was on the move down the Maqasis canal bed, but there still remained about 2,000 men waiting to be ferried across in the pontoons and *bellums* which were being rowed backwards and forwards. The Turkish movements continued to be reported from the air during the rest of the day, sometimes under conditions of hail and rain. We need not, however, consider the further reports in detail.

A belief has persisted in service circles that the failure to press home the attack, and the consequent failure to relieve Kut, would almost certainly have been avoided if due attention had been paid to the information provided by the air reconnaissance reports. One may imagine the feelings of the air observers who looked down on the Turkish defences and saw them lightly held, and then watched the enemy reinforcements hurrying forward. The drama was presented to them as a race against time in which the British appeared voluntarily to be conferring upon the enemy the advantage of an unrestricted start. Now that all the relevant facts are known, however, it is clear that what the air observers saw did not make, and could not have made, any vital difference to the battle. It is true that the air reports correctly gave the general position and therefore provided much useful information for the headquarters staff, but apart from the fact that the first report was not delivered until after 9 a.m., by which time the Turkish reinforcements had begun to take their places in the trenches, it is certain that the fatal delays in making the British attack could not have been obviated by any information, no matter how timely and complete, which might have been received from the air. The absolute need for vigour and dash had been firmly impressed upon all concerned at a conference on the afternoon of the 7th of March at Lieutenant-General Aylmer's headquarters, and was indeed obvious. Furthermore, at 8 a.m. on the 8th, the commanders of two of the attacking brigades had represented to the general officer responsible for the whole operation the dangers attending further delay and they had urgently pleaded for permission to begin their advance at once. This permission, however, was refused because the general arrangements for the attack were still incom-

plete. In particular, one brigade was at the time on the move along the Dujaila depression, making its way to a better position for deployment.

The reader may perhaps ask why the Turkish reinforcements were not bombed from the air. They were clearly seen marching into battle, and they were watched as they ferried across the Tigris. Here surely was an opportunity for the Royal Flying Corps to shatter the enemy columns, or at least to delay their coming into action. In the light of our later knowledge it is reasonable to assume that successful bombing would almost certainly have turned the scale in favour of the attackers. Nor is there much doubt that if the action were fought again with the same weapons, but according to modern ideas, all the available aircraft would be diverted for bombing attacks on the advancing reinforcements.

The total aircraft available were four aeroplanes of the Royal Flying Corps, and two aeroplanes and three seaplanes of the Royal Naval Air Service. To understand the views at the time about the value of bombing it will be necessary to recall the conditions under which pilots and observers had to work. The demands made by the corps staff for strategical and tactical reconnaissance, and by the artillery for co-operation, could at no time be fully met, and pilots and aircraft alike had to be subjected to prolonged and severe strain. Furthermore, the aircraft had to be left exposed in the open, and their airworthiness rapidly deteriorated. For these reasons, bombing was seldom undertaken. It was held that the risk of loss entailed by flying low enough to ensure a reasonable chance of a hit on the target was not generally acceptable. The opportunity on the morning of the 8th of March, however, was exceptional, but it is highly doubtful whether the air commander was in a position to assess the needs of the moment. It would appear that except for what he learned from his air reports he knew little or nothing of what was happening in the Dujaila area. The vital time, when bombing would have been most useful and might have been decisive, was when the second morning reconnaissance aeroplane landed at 9.15

a.m. and reported the eighteen Turkish companies moving towards the Dujaila Redoubt. The opportunity, however, was missed, and the Turkish reinforcements were enabled to get into position, unhampered, before the British infantry attack was fully developed. The result was that the infantry could make no appreciable headway, and as the day wore on the opposition stiffened while the attackers became more tired. By the evening Lieutenant-General Aylmer decided that it was useless to continue. The British column was far from its water and supplies and could not be supported, and on the morning of the 9th, therefore, the withdrawal began. While the troops who had come within sight of the guns of Kut, no more than eight miles away, were marching with their backs to the town they had set out to relieve, the aeroplane observers kept watch to report any Turkish attempts to pursue or outflank them.

The Advance Resumed

A month of inactivity followed. On the 11th of March Lieutenant-General Sir G. F. Goringe succeeded Lieutenant-General Aylmer in command of the Tigris Corps. Reinforcements began to arrive and preparations, impeded by heavy rains and by floods, were made for a direct attack on the Umm al Hanna position. Meanwhile, on the 18th of March, bombs from a German aeroplane fell into the hospital at Kut and killed six men and wounded twenty-six, fourteen of whom died later. Major-General Townshend asked, by wireless, that Royal Flying Corps aeroplanes should retaliate by bombing the German aerodrome at Shumran Bend, and also asked that an aeroplane should be sent to drop smoke-balls on two big naval guns which were being placed in position for the bombardment of Kut. The smoke-balls would give him the range and enable him to attack the enemy guns with his own 5-inch. It was decided that the risk of sending the few available aeroplanes to bomb the German aerodrome was too great. The enemy fighting aircraft were superior in performance to the reconnaissance aeroplanes of the Royal Flying Corps and it was extremely doubtful whether any bombing of

the Shumran Bend aerodrome could be made effective. Lieutenant-General Gorringe was already hampered by his inability to allot aeroplanes for artillery observation, and he was indeed compelled to postpone his assault on Hanna for a few days to permit of the arrival of three additional aeroplanes on their way to join him. In reply to Major-General Townshend's request, however, an aeroplane was sent to co-operate with the Kut guns in their fire against the enemy naval guns, and, as a result, the two Turkish guns were so damaged that they never came into action.

The attack on the Hanna position began at 5 a.m. on the 5th of April and was immediately successful. The Turks had evacuated the position during the night, leaving only a rear-guard to man the front line. Within two hours the five lines of the defence system had been captured, but meanwhile the air observers who were reporting the progress of the battle gave the information that the Turks were strongly reinforcing the Fallahiya position, 6,000 yards farther west, and also the Sanniyat lines about the same distance beyond. The Fallahiya entrenchments could be approached only over open ground, and as a result of the great heat, of a mirage, and of the air information that the position was strongly held, the attack on it was delayed until the evening. The advance began at 7.30 p.m. and, within a short time, the Fallahiya trenches had been captured and consolidated.

The definite success of the 5th of April encouraged a hope that the relief of Kut would not be much longer delayed. There now remained only the Sanniyat and Es Sinn positions in front of the relieving force. Two trench systems, little less formidable, had been overrun in one day and it seemed reasonable to hope that the same skill and courage which had led to the fall of the first two lines would suffice to carry the third and fourth. The air reports had revealed that the Turks had no trenches on the extreme left of the Sanniyat positions which had previously been protected by flood waters from the Suwaiqiya marsh, but had been uncovered by a recession of the waters. The 7th Division, therefore, was

ordered to move, under cover of darkness, against the Turkish left flank, but all hopes of a successful outflanking movement were quickly dashed by the weather. The Tigris, swollen with the melted snows from the Armenian hills, rose rapidly, and at midday on the 6th of April it reached the highest flood-level of the year. The Suwaiqiya marsh was flooded and the wind, changing to north-west and bringing rain and hail, blew the Suwaiqiya waters across the right of the 7th Division, and the troops on that front had to withdraw. At 4.20 a.m. on the 9th the attack on the Sanniyat position was made, but Turkish counter-attacks forced the British troops back. The attacks were continued up to the 22nd, but the flooded country greatly restricted and narrowed all movements and none of the attacks succeeded: all hope of relieving Kut was at an end.

Dropping Food in Kut

While the attacks were being made, the air detachments continued to supply information about the Turkish strength and reinforcements, and particular attention was paid to the flooded areas which were frequently surveyed for change. There was, in addition, some photography of the Turkish positions and gun emplacements. The chief work of the air service, however, was a gallant but abortive attempt to supply the beleaguered garrison in Kut with food. For some weeks miscellaneous articles such as medical comforts, wireless parts, launch engine parts, mails, newspapers, and money, had been dropped intermittently into Kut from the air. On the 27th of March, in answer to an urgent request from Major-General Townshend, a millstone weighing 70 lb. was successfully dropped by parachute. While the attempt to force the Sanniyat positions was still in progress it became urgently necessary to prolong the powers of endurance of the Kut garrison. Major-General Townshend reported by wireless that he would require at least 5,000 lb. weight of supplies to be delivered every day, made up of flour, sugar, chocolate, salt, and Ghi (a clarified

butter used by natives of India for cooking). That amount would give 6 oz. each to his 13,840 troops and followers and 3,700 town Arabs. He stated that, after the 24th of April, the besieged would be dependent on the air service for all food except horse meat, the supply of which would last until the 29th.

Orders were given to the air detachments to drop as much food as possible in Kut, subject to the maintenance of a limited amount of reconnaissance work and co-operation with the artillery. Food dropping began on the 15th of April. The available aircraft were eight B.E.2c's of No. 30 Squadron, and one Voisin and one Henri Farman aeroplanes, and four Short seaplanes, of the naval air unit. Of these, four B.E.2c's, the two naval aeroplanes, and three of the Short seaplanes, were used for food dropping. The distance between the aerodrome at Ora and Kut was twenty-three and a half miles. Bomb frames were removed from the aircraft and a hastily designed apparatus, fitted with a quick-release gear, was substituted. That used on the aeroplanes consisted of a long bar pivoted at one end and held by the release gear at the other. The B.E.2c's carried a 50-lb. bag, lying fore and aft on each wing against the fuselage, and two 25-lb. bags between the chassis struts, slung over the long bar above mentioned. This distribution was found, after experiment, to be the only possible one for the inherently stable B.E.2c, but so loaded the aeroplane was difficult to fly, and the head resistance set up by the bags was out of proportion to their size and weight. The Voisin and Henri Farman aeroplanes carried their total load (150-200 lb.) under the fuselage without difficulty, but in the seaplanes the bags (200-250 lb.) were held by a canvas band to prevent them fouling the water. All the aeroplanes were flown as single seaters and, to allow of a greater amount of food being carried, the armament was left behind, the pilot having to content himself, for defence, with a revolver.

In all, 140 food-dropping flights were made and 19,000 lb.-weight of food dropped between the 15th and 29th of April,¹ the biggest day being the 15th when 3,350 lb.

¹ Kut acknowledged the receipt of 16,800 lb.

of supplies fell in Kut. On the 16th Lieutenant-General Gorringe sent a message by wireless to say that the maximum quantity which the air service would be able to drop in one day would be 3,350 lb., and he advised that the daily ration to the garrison should be cut from 6 ounces to 4 ounces. Major-General Townshend at once reduced the ration, but in his reply the same day he said: 'This puts a new light on the question. If they cannot 'put in 5,000 lb. a day I see nothing for it but that a 'steamer should run the blockade.' In the evening of the 24th a fine attempt by the *Fulnar*, one of the fastest steamers on the river, laden with 270 tons of supplies, was made to run the Turkish blockade. Her screw, however, fouled a chain which the Turks had stretched across the river and she was captured.

The German fighters first began to attack the food-laden aeroplanes on the 24th, and it became necessary to provide an escorting aeroplane carrying an observer and Lewis gun, thus cutting down the number of aeroplanes available for food dropping. On the 26th a seaplane was shot down in air combat, and on the same day the pilot, Lieutenant D. A. L. Davidson, in an unarmed B.E.2c, was wounded by a Fokker's machine-gun, and the B.E.2c was damaged but was landed safely on its aerodrome. Owing to the urgency of the need for aeroplanes at the front three out of four Maurice Farman's which had arrived at Basra from England were flown up-country without delay on the 26th. They safely reached the forward aerodrome in the wadi, but did not long survive. A storm during the night of the 2nd of May wrecked all three as they stood pegged down in the open.

Meanwhile, on the 26th of April, Major-General Townshend, under instructions from Sir Percy Lake, had opened negotiations with the Turkish Commander and, on the 29th, after all guns and ammunition had been destroyed by the besieged, a Turkish battalion marched into Kut and the surrender was formally completed. After the capitulation, some 12,000 prisoners were marched 700 miles into Anatolia, but over 4,000 of them failed to live through their captivity. Of the forty-four Royal

Flying Corps non-commissioned officers and men with the besieged, few survived the march.¹

The Advance to Baghdad: Preparations

[Maps, pp. 249 and 300]

After the fall of Kut, the British and Turkish forces were comparatively inactive until the end of 1916. Both sides were exhausted by the fighting, by the climatic conditions of the country, and by the supply and communication difficulties. The British Government, when it authorized General Lake to negotiate the surrender of Kut, had stated that the subsequent attitude of the British forces in Mesopotamia must be defensive. The Russians, however, were moving against Baghdad from Persia, and he was asked to assist by keeping the Turks on the Tigris occupied, and he was not, therefore, to withdraw his force farther than might be necessary for tactical reasons. An additional reason against withdrawal was the possible effect on the Arabs, and on Persia and Afghanistan.²

An air reconnaissance on the 19th of May³ reported that the Turkish troops had evacuated the advanced positions on the right bank of the Tigris at Es Sinn, but that the Sanniyat line was strongly held. On receipt of this information, the British advanced along the right bank, and on the 20th occupied the Dujaila Redoubt. Subsequent air reconnaissances revealed that, except for small rear-guards covering the bridges over the Hai river, the country on the right bank of the Tigris was clear as far as the Hai. The retention by the Turks of the Sanniyat lines made transport on the Tigris impossible, and the troops operating on the right bank towards the Hai river

¹ The Australian air historian quotes an account of an officer prisoner which says that only six men survived. See *The Australian Flying Corps*, by F. M. Cutlack, p. 26. Official figures are not available.

² In February 1916, the War Office had taken over the general direction of the operations in Mesopotamia, but India remained responsible for the administration of the force. This dual responsibility proved unsatisfactory and, in July 1916, the Army Council assumed full control.

³ The Royal Flying Corps detachment had moved back to the aerodrome at Shaikh Saad on the 6th of May.

had therefore to depend entirely on land transport and their advance to occupy the positions evacuated by the Turks had to be made gradually. The opposing forces settled down on the Hai-Sanniyat front to trench warfare, but along the strung-out lines of communication back to Basra there was great activity and preparation. Railways were built, the shallows of the river dredged, protective embankments constructed, the hospital service was reorganized, and, in particular, the whole of the water transport system was expanded and remodelled. In August 1916, Sir Percy Lake was succeeded in the command by Major-General F. S. Maude, who continued and perfected the preparations for a resumption of the offensive.

The operations to relieve Kut, especially the food-dropping flights, had thrown a great strain on the air personnel. Owing to the exposure of the aeroplanes to the weather, and to the unsuitability of the aircraft, particularly of the engines, to withstand the extremes of the Mesopotamian climate, the officers and mechanics had been compelled to work feverishly day and night to maintain the aeroplanes in some sort of flying trim. Aware that the starving garrison in Kut had reached the stage when they depended entirely on such food as could be dropped from the air, the men had worked unsparingly, and pilots and mechanics who were sick to exhaustion had spurred themselves to keep going so long as the urgency remained. When the tension was over, and as the thermometer mounted, there was much suffering among the flying personnel. The war diary of No. 30 Squadron for May records: 'From eight pilots in April, the Squadron 'Flights in the field suddenly dwindled to two pilots and 'finally to one pilot each. All the others went to hospital, 'more or less seriously knocked up, directly after the strain 'due to the feeding of Kut was over. The hot weather 'came on apace, and there were many admissions to 'hospital among the rank and file also.' Thus handicapped, the flying detachment at the front had a trying time and the enemy pilots, with their better equipment, quickly asserted a definite superiority.¹

¹ 'The superiority of the enemy planes . . . combined with a large

The Royal Naval Air Service detachment was withdrawn from Mesopotamia at the end of June. The seaplanes had proved unsuitable for work on the Tigris and they were sent to Egypt, but the two naval Voisin aeroplanes were handed over to the Royal Flying Corps, together with miscellaneous spare parts and stores. On the 29th of June, the day the naval air personnel embarked at Basra, there arrived from Egypt a Naval Kite Balloon Section—No. 14—with four balloons. These were welcomed for work with the artillery, and the section was placed immediately under army administration.¹

On the 19th of July, by which time many new pilots had arrived, the establishment of No. 30 Squadron was increased from twelve to eighteen aeroplanes, and the squadron was placed under the general administrative orders of the Middle East Brigade, the head-quarters of which was in Egypt. On the 31st, Major J. E. Tennant arrived in Mesopotamia to take command of the squadron, and he brought with him additional pilots who had been trained in night flying and fighting.² At the same time, Major N. D. K. MacEwen succeeded Major P. W. L. Broke-Smith as Assistant Director of Aviation. At the beginning of August, No. 30 Squadron had thirteen serviceable B.E.2c's, seven were being overhauled, and seven more were being unloaded at Basra. Major Tennant was now in a position to resume the offensive against the enemy in the air and to augment the reconnaissance and photographic work required by the army. On the 13th of August a Fokker was shot down over Shumran aerodrome, the first enemy aeroplane to fall on this front in air combat, and, next night, the 14th, the first of a series of intermittent night bombing attacks on

'reduction in the number of our pilots (due to sickness partly attributable to overwork) enabled the enemy in May and June to establish what was 'very nearly a mastery of the air.' (Sir Percy Lake, in his official dispatch.)

¹ The kite balloons were used to direct the fire of the ships bombarding the Turkish forward positions from the Tigris, and also worked with the corps artillery.

² An authentic account of the subsequent work of No. 30 Squadron is given in *In the Clouds above Baghdad*, by Lieutenant-Colonel J. E. Tennant, D.S.O., M.C.

the German aerodrome was made. A notable attack was that made on the 23rd of September, when Lieutenant the Hon. J. H. B. Rodney and Second Lieutenant J. S. Windsor, flying B.E.2c's as single-seaters, bombed the aerodrome from under 100 feet and destroyed one aeroplane and damaged another. A direct hit on an Albatros on the Shumran aerodrome was also obtained by Captain H. de Havilland, with a 20-lb. bomb, on the 2nd of November. As a result of the offensive against the German Air Service the Royal Flying Corps regained air superiority, and the work of co-operation with the army was enabled to proceed with little or no enemy interruption. Other bombing objectives were Arab strongholds, Kut, Baghdad, and the pontoon bridges across the Tigris north of Kut. The main work of No. 30 Squadron up to the time when the military offensive was resumed was reconnaissance, photography, and co-operation with the artillery. No accurate maps of the area of the Tigris were available, and the country had to be photographed, mile by mile, in order that maps might be made. Of particular military value were the maps, compiled from air photographs, which laid bare the trench systems in the various Turkish defensive positions. A systematic programme for the destruction of the Turkish gun-pits behind the Sanniyat position was begun in August with the help of 'C' Flight of No. 30 Squadron, under Captain J. H. Herring, which moved forward to Arab Village, the headquarters of the 7th Division, on the 17th of August.

The reorganization of the forces in Mesopotamia had progressed so well that, in the middle of October, General Head-quarters moved from Basra to Arab Village. Except for 'A' Flight, which remained at Shaikh Saad for bombing operations, No. 30 Squadron had concentrated at Arab Village early in the month.

About this time the question of the future military operations in Mesopotamia was the subject of a triangular discussion between the British Government, the Commander-in-Chief in India, and Major-General Maude. The British Government had, on the 28th of September, defined the mission of the Mesopotamia Expeditionary

Force as follows: 'To protect the oilfields and pipe-lines 'in the vicinity of the Karun river, to maintain our 'occupation and control of the Basra *vilayet*, and to deny 'hostile access to the Persian Gulf and Southern Persia. 'No fresh advance to Baghdad can at present be contemplated, but it is the desire of H.M. Government, if and 'when possible, to establish British influence in the 'Baghdad *vilayet*. This further advance should not be 'undertaken unless and until sanction for it is given. . . .'

After a long exchange of telegrams it was ultimately agreed that Major-General Maude should advance his left to the Hai river. It was impressed on him that as his force could not be increased, he must avoid losses which gave no adequate return. Major-General Maude made it clear that his operations would be conducted in steps, with a careful review after each step before the next move was made. His first step would be to get a firm footing on the Hai, after which he would be favourably placed to act against the Turkish communications, and might also force the enemy to evacuate the Sanniyat positions.

It was on this basis that the operations began, and it is clear that no appreciable advance was contemplated at the beginning. On the 15th of November the Tigris Corps was formally disbanded and, in its place, the I Indian Army Corps (3rd and 7th Divisions) and III Indian Army Corps (13th and 14th Divisions) came into being. By the end of the month the preparations were nearing completion. For some weeks a steady stream of reinforcements had moved up the Tigris, and ammunition and supplies had been accumulated in the forward areas. The troops had shaken off the ill effects of the hot weather and were in good spirit.

Throughout the summer the Turks had methodically strengthened their defensive positions. The most forward system, at Sanniyat on the left bank, flanked on one side by the Suwaiqiya Marsh and on the other by the Tigris, had been much elaborated, while behind Sanniyat the fifteen miles of hinterland as far as Kut had been traversed by additional reserve lines. On the right bank of the river the Turks still held the line to which they had withdrawn

in May after evacuating the Es Sinn position. This line extended from a point on the Tigris three miles north-east of Kut, across the Khudhaira Bend, and to the Hai river two miles below its exit from the Tigris. There the line crossed the Hai and ran in a north-westerly direction to the Shumran Bend of the Tigris. There was a pontoon bridge across the Hai near its junction with the main river. This bridge was protected by a system of entrenchments, and the Turks also occupied the line of the Hai for several miles below the bridgehead position. The weakness of the Turkish defence system was that the Sanniyat position on the left bank was about twelve miles downstream in advance of the forward defence lines on the right bank. At Sanniyat the British trenches were within 120 yards of the Turkish front line, while, on the right bank, the British were about eleven miles upstream of Sanniyat with advanced posts two miles from those of the Turks opposite the Khudhaira Bend, and with other posts about five miles from the Hai.

The Offensive Opens

[Maps, pp. 249 and 300]

By the 12th of December all was ready for the offensive. The plan was to hold the enemy to the Sanniyat position while a surprise march was made on the right bank to secure a footing on the Hai. The bombardment at Sanniyat began on the 13th. The Royal Flying Corps on this day was ordered to make reconnaissances to ascertain whether Turkish reinforcements were within thirty miles of Kut, and also to prevent enemy airmen from reconnoitring the British movements. Two Martinsyde Scouts¹ were kept ready to go up at once if and when enemy aeroplanes were reported. One enemy reconnaissance was attempted, but before the German aeroplane reached the front it was attacked at close range and, possibly damaged, went back immediately to its aerodrome, so that the

¹ Six Martinsyde Scouts had arrived in September 1916. They were fitted with 120 horse-power Beardmore engines. The original Martinsydes used in 1915 had 80 horse-power Gnome engines.

reconnaissance was never made and the British movements, on the secrecy of which the success of the operation depended, went undetected. The Royal Flying Corps reconnaissances during the day reported no new enemy concentrations or reinforcements. The aeroplanes of 'C' Flight co-operated with the artillery of both the attacking corps, and the kite balloons helped to direct the fire of the bombarding ships at Sanniyat.

At 6 a.m. on the 14th the Hai was crossed without opposition at two points. An attempt made by the Royal Flying Corps before dawn to cut the bridge of boats which spanned the Tigris at Shumran was unsuccessful. Without this bridge the Turkish command would have found it difficult to reinforce the right bank from the left, and three pilots aimed eight 20-lb. and four 100-lb. bombs at the target, but failed to get a direct hit. By continuous close reconnaissances throughout the day, No. 30 Squadron kept General Head-quarters in touch with the main movements, British and Turkish. Signals of white calico, with numbers to indicate the identity of the brigade or battalion, were displayed by the various formations on the ground, and a series of pre-arranged code letters added to the ground strips enabled the infantry units to convey simple messages to the air observers. There was some co-operation with the artillery against fleeting targets and there were attacks, with bomb and machine-gun, on enemy troops. The cavalry had pushed on, during the day, westward of the Hai towards the Shumran bridge, but had been checked by infantry fire near the bridge. In the evening the Cavalry Division withdrew to bivouac at Atab, where two bridges had been thrown across the Hai. The 39th Infantry Brigade with artillery and divisional cavalry in support had advanced during the day along the left bank of the Hai and had established themselves, by 3 p.m., on a line running north-eastward for one and a half miles from the Umm as Saad ford. Infantry patrols, meanwhile, had ascertained that the Turks were holding the trenches across the Khudhaira Bend and those covering the Hai bridge.

During the night of the 14th/15th of December,

Captain J. H. Herring, while making a moonlight reconnaissance to look for any Turkish movements which might be taking place under cover of darkness, saw that the bridge of boats, which had spanned the Tigris east of Shumran, had been dismantled and was being towed upstream in sections. Captain Herring, who had eight 20-lb. bombs with him, attacked the towing steamer and the boats, and twice returned to Arab Village for more bombs. He dropped, in all, twenty-four 20-lb. bombs and so disorganized the line of boats that they were out of control for six hours, and the result was that the enemy had no effective communications between his forces on the left and right banks of the river until the 17th, when the bridge was re-established west of Shumran.

Major-General Maude ordered special air reconnaissances to take place at dawn on the 15th to ascertain the disposition of the Turkish forces and any changes that had taken place. On receipt of the air reports, which showed that there was little movement but that the enemy was in some strength south of the Shumran Bend, Major-General Maude issued his orders for operations to begin at 9 a.m. The III Corps was to throw its left forward to a specified line and then push out patrols to test the Turkish strength. The Cavalry Division, advancing to Kala Haji Fahan on the Hai river, was also to test the Turkish strength in the entrenchments which formed the western shoulder of the Hai salient, and was to send strong patrols to reconnoitre towards the Shumran Bend. The task of the I Corps was to make a systematic bombardment of the Sanniyat position, and the naval flotilla was asked to co-operate. By 1 p.m. the III Corps, meeting with little opposition, had occupied its objective line. At noon an air reconnaissance made it clear that the Turks had few troops on the right bank of the river in front of the III Corps and, at 1.20 p.m., General Head-quarters ordered the Corps to push on rapidly to an advanced specified line;¹ the troops had not quite gained the whole of the new line when darkness set in. The

¹ A note in the General Head-quarters Operations War Diary records: 'R.F.C. carrying out excellent work in reconnaissance and observation.'

cavalry, who had discovered that the Turks held the western shoulder of the Hai salient in strength, returned at dusk to bivouacs on the Hai.

On the 16th Major-General Maude further extended his footing on the Hai, while the Sanniyat positions, as well as the Kut and Hai salient areas, were effectively bombarded with the help of the air observers. During the day air reconnaissances were continuous, and thirty-two 20-lb. bombs were dropped on various targets, including camps and barracks at Shumran, and Dahra.

Special air reconnaissances on the morning of the 17th of December disclosed no important enemy movements and no new works between Shumran and Kut, and confirmed that the right bank of the Tigris was clear of Turkish troops outside the entrenched positions.

After studying his air reports, Major-General Maude issued an order at 11 a.m. in which he outlined his future intentions. Broadly summarized, his plan was to contain the enemy at Kut and to the eastward, with the I Corps and with part of the III Corps, while he manœuvred westward with the Cavalry Division and the remainder of the III Corps to strike at the enemy's communications.

During the night of the 17th/18th aeroplanes bombed the Turkish river craft east of Kut and a hit with a 20-lb. bomb was made on a moored steamer. On the 18th the Cavalry Division moved out to shell the Shumran boat bridge, which it did in the afternoon with the help of an aeroplane observer who dropped smoke-balls over the bridge to indicate its position. The cavalry, who had arrived late, had to withdraw again after a brief bombardment and the bridge remained intact.

The 19th of December was spent in consolidation, and in a redistribution of the troops. The advance had taken the British within reach of the Turkish communications west of Kut, and Major-General Maude judged that the time had come for an operation to sever these communications. A column was sent out on the 20th with orders to bridge the Tigris at the brick kilns, about four miles west of Shumran, and so get astride the Turkish communications. The column found the enemy in

strength on the left bank of the river, and as the policy was to avoid heavy casualties the attempt to force a crossing was discontinued and the column withdrew. Two aeroplanes which co-operated with the column had an encounter with an Albatros two-seater which was shot down and crashed. One of the Royal Flying Corps aeroplanes was hit by fire from the ground and the engine disabled; the pilot, however, was able to land within the British lines. The usual close and distant reconnaissances were made and the air co-operation with the artillery in the bombardment of the Sanniyat and Kut-Hai positions continued.

On the 21st of December, under special orders from General Head-quarters, the Turkish depots at Bughaila on the Tigris east of Kut were attacked by seven B.E.2c's and three Martinsydes with sixty-six 20-lb. and 112-lb. bombs. Buildings on the riverside were damaged and a steamer was hit, and there is evidence that a panic prevailed while the bombing was in progress. Bughaila was attacked again before dawn on the 22nd by three pilots, and, during the morning, by two more.

Until the middle of January 1917, while consolidation of the positions on the Hai proceeded, there was little of importance to record. On the 24th of December an air reconnaissance of the whole of the Tigris as far as Baghdad was made and no massing of Turkish troops was disclosed; this was the first visit paid to Baghdad by a British aeroplane since the battle of Ctesiphon. On the 26th of December the weather broke, and for a fortnight there was steady rain which led to a rise of the Tigris and to the flooding of large tracts of country with the result that the maintenance of supplies became difficult.

The position of the enemy in the Khudhaira Bend had become a menace to our communications with the Hai. The Turks had control of the marginal 'bunds' on the river and could, in flood-time, open these and swamp parts of our line. Major-General Maude, therefore, decided to clear the Khudhaira Bend, and operations began on the 7th of January and, by the 19th, after severe hand-to-hand fighting, had been successfully completed. While this

fighting was in progress, the weather was misty and the Royal Flying Corps could do little to help.

On the 20th of January, a fine day, three pilots bombed the citadel at Baghdad where the Turks had a munition factory. Two of the six 100-lb. bombs dropped hit the citadel, but they failed to explode. The pilots, during their flight, made a detailed reconnaissance of the Turkish positions at Ctesiphon, Diyala, and Baghdad, and of shipping and railway movements, and the information they brought back was added by General Head-quarters to special maps which were distributed to the army commanders.

On the same day there was a reorganization of the Royal Flying Corps units. Major J. E. Tennant was appointed Wing Commander in command of the Royal Flying Corps in Mesopotamia, and the command of No. 30 Squadron passed to Captain H. de Havilland. The appointment of assistant director of aeronautics was abolished.

On the 11th of January preparations were begun for the reduction of the Hai salient and, by the 24th, the British trenches had been advanced within 400 yards of the Turkish front line. On the 25th, the enemy's front line was captured along about 1,800 yards and, by the 28th, in spite of strong Turkish counter-attacks, we held about two miles of the position to a depth of from 300-700 yards. On the 27th, 'C' Flight of No. 30 Squadron, which had specialized in the work of co-operation with artillery, had moved forward to a landing-ground at Sinn Abtar, and, for the remainder of the action on the Hai, helped to direct the fire of the artillery on the Turkish batteries and trenches and on fleeting targets, and continuously reported the progress of the operations.

On the 1st of February, when the troops were assembled ready to attack the Turkish third line of the Hai salient, an aeroplane engaged in registering the artillery on enemy gun-pits preparatory to the assault was attacked by a Fokker which the British pilot, Lieutenant J. R. Burns, shot down with a burst of five shots. The brief encounter was watched by the British infantry, who saw the Fokker

crash just as they left their trenches to attack the Turks, and they went over stimulated by the incident.¹ On the right, the Turkish third line was won and held, but on the left gains which were made could not be maintained in face of strong Turkish counter-attacks.

Next day the III Corps extended its left towards the Tigris and, by the 4th of February, the last of the enemy troops east of the Hai had withdrawn to the Liquorice Factory in the western angle between the Hai and the Tigris, and to the Dahra Bend. The Liquorice Factory—a nest of machine-guns—was heavily bombarded with the help of aeroplane observation, and on the 9th the infantry attack was renewed along the whole line. Next day, to the accompaniment of a high wind and dust storms, the Factory was captured and the general forward movement continued. The discomfiture of the enemy was made more acute by the success of an aeroplane observer who, at a range of 9,800 yards, directed the fire of a 60-pounder battery on the bridge at Shumran which was broken up; direct hits were also made on a barge and on two gun-pits.

The advance continued in the Dahra Bend on the 11th and, by the evening, the left of the III Corps was resting on the Tigris south of the Shumran Peninsula, and the Turkish troops in the Dahra Bend had been completely enclosed with their backs to the river. There was no flying on the 11th owing to the violence of the gale (this was the only day during the operations when the aeroplanes were kept on the ground), and there was little flying on the 12th. But air reconnaissances on this day disclosed that the damaged bridge had been removed from the Shumran Bend, and that a collection of pontoons about five miles higher up the river indicated an impending new attempt to bridge the stream. The air observers also reported on this day, and on the two subsequent days, the digging of new trenches and gun-pits.

By the 15th of February all was ready for a resumption

¹ Among documents captured later was a Turkish message asking the German aeroplane squadron to make arrangements to remove the debris of the Fokker in which the body of the dead pilot was wedged.

of the attack. Although the day was cloudy, rain held off until the evening and the aeroplanes were able to co-operate fully. The main attack was launched against the Dahra Bend defences at 8.30 a.m., and the air observers helped all day to direct the artillery against the Turkish batteries across the river, and against all the possible ferry places on both banks. Time and again pontoons, laden with Turkish troops, were caught by the artillery, as a result of wireless calls sent down from the aeroplanes, and they were smashed before they could make the crossing. By the morning of the 16th the whole of the Dahra Bend had been captured with more than 2,000 prisoners.¹

Crossing the Tigris

The right bank of the Tigris as far as Bughaila was now clear of the enemy, but far back, down the left bank, the Turks still remained entrenched in the formidable Sanniyat positions. Major-General Maude decided to attack at Sanniyat with the object of directing the full attention of the Turks to that front while he threw the III Corps across the river in the neighbourhood of Shumran. The first attack at Sanniyat was made on the 17th of February, when the first and second lines of trenches were captured on a front of about 400 yards, but could not be held. Torrential rain on the evening of the 16th and on the 17th made the country waterlogged and sent the yellow waters of the Tigris swirling down in spate. For a few days there were no active operations, but the preparations for the bridging of the river at Shumran proceeded. A second attack at Sanniyat was ordered for the morning of the 22nd to cover the crossing of the river upstream which was timed to begin in the early hours of the 23rd. On the successful bridging of the Tigris, and the passage of the III Corps across to the left bank, the whole strategy of the operation depended, and the Royal Flying Corps was

¹ The B.G.R.A. III Corps sent a telegram on the 16th to Lieutenant-Colonel J. E. Tennant, saying, 'Please accept yourself and convey to your squadron warmest thanks of all artillery III Corps for constant and 'invaluable co-operation which alone rendered possible close support of 'infantry.'

asked to prevent any German aeroplane from leaving its aerodrome on the 23rd to discover the British intentions. The Royal Flying Corps was further requested to keep the army commander, and the subordinate commanders who were charged with the task of bridging the river, fully informed throughout the 23rd of the progress of the operation, to co-operate with the artillery of the III Corps, especially against any Turkish guns which threatened the bridge, and to work with the artillery of the I Corps in the attack on the Sanniyat defences.

The Sanniyat attack on the 22nd of February, in which the aeroplanes duly co-operated, secured the first and second enemy lines. On the 23rd, at dawn, the first aeroplane flew across to the German aerodrome and, at any sign of activity below, the pilot dropped a bomb. He maintained his patrol until relieved in accordance with a prearranged programme, and in this way, by a relay of single aeroplanes, the German pilots were kept on the ground until 5 p.m. when one succeeded in getting into the air. By that time, however, any air reconnaissance the enemy might make could only be of inconsiderable value. The first British troops had crossed the Tigris by ferry at 7.30 a.m., and by 4.30 p.m. the bridge had been completed and was open for traffic. It was a brilliant feat and may be set down as one of the master strokes of the campaign. By nightfall the infantry of one British division were across the river and another division was ready to follow. At Sanniyat the success had also been striking and the Turkish third, fourth, and fifth lines had been won.

Retreat and Pursuit

As darkness fell on the evening of the 23rd there was excitement in the British lines, and the Royal Flying Corps officers looked forward eagerly to the morrow. What they expected to find was the Turkish army in precipitate retreat. Lieutenant-Colonel Tennant was given a free hand by Major-General Maude. 'An army 'on the run over flat desert', he says, 'and the complete 'mastery of the air, one's wildest dreams had come true. 'The weary pilots got in to snatch a few hours' sleep,

'while the mechanics spent the night loading machines 'with bombs and overhauling engines.'¹

At 6.30 a.m. on the 24th of February the first pilot returned to report the Turks in full retreat from Sanniyat. At Shumran, however, the enemy held on tenaciously to cover this retreat, and, as a result, the cavalry failed to break through. Had they done so the Turkish army might have been routed. Fourteen aeroplanes were available,² but some of the air activity on the 24th had to be diverted to co-operation with the artillery in the Shumran area in an attempt to smash through the enemy defence, and to reconnaissance in order to keep the British command informed of the changing situation. But nine bombing flights were made, during which sixty-six 20-lb. and two 65-lb. bombs were dropped on massed bodies of retreating Turks. Major H. de Havilland, the commander of No. 30 Squadron, succeeded in getting hits, with 22 of the 24 bombs he carried on two trips, on massed infantry.

The enemy rearguards, which had fought so well and so effectively on the 24th, withdrew during the night, and on the 25th the British were in full pursuit. The aeroplanes kept watch on the enemy movements and reported throughout the day to the pursuing commanders. The Turkish rearguard made a stand about eight miles from Shumran, but was pushed back, after stubborn fighting, to a prepared position two miles farther west. The cavalry, which attempted to get round the Turkish flank, was prevented from doing so by entrenched infantry. The main enemy body, which had been discovered from the air at Bughaila in the morning, was rigorously bombed. Ten bombing flights were made and ninety-two 20-lb. and two 65-lb. bombs dropped, and, although some of them failed to explode, the general effects were demoralizing.

On the 26th of February the enemy retreated rapidly and outstripped the pursuing infantry. Guns and much material were thrown into the river, or abandoned. The gunboat flotilla steamed up-river at full speed, and, after a

¹ *In the Clouds above Baghdad*, p. 84.

² Two aeroplanes of No. 30 Squadron were on detachment at Nasiriya to watch the Turkish force on the Euphrates front.

running fight, recaptured H.M.S. *Firefly* which had been lost earlier in the campaign. The rear ship of the Turkish flotilla was sunk, the *Pioneer*, burning fiercely but still firing her guns, was run ashore, and the *Basra*, with 700 Turkish and German wounded as passengers, was run ashore by a badly wounded British officer who was a prisoner on board. On this day the aeroplanes moved to the aerodrome at Shumran, and their main work was reconnaissance and message-dropping; only one bombing flight was made, during which twelve 20-lb. bombs were dropped on troops.

Throughout the 27th the gunboat flotilla was in close action, sometimes at point-blank range, with the retreating Turks. Air reconnaissances located about 2,000 of the enemy at Aziziya, with the British cavalry in touch, and messages were dropped giving details of the Turkish dispositions. One of the British pilots has recorded: 'Flying towards Aziziya the spectacle was amazing and 'horrible; dead bodies and mules, abandoned guns, wagons 'and stores littered the road, many of the wagons had 'hoisted the white flag, men and animals exhausted and 'starving lay prone on the ground. Few of these, if any, 'survived the attentions of the Arab tribesmen, hanging 'round like wolves on their trail. Further on I came up 'with the rear party on the march. Flying along about 'ten feet from the road, I mowed down seven with one 'burst of machine-gun fire; it was sickening; they hardly 'had the strength to run into the nullahs and fire back; 'those hit just crumpled up under their packs and lay still; 'others waved in token of surrender and supplication for 'rescue. . . .'¹

On the 28th, a day of high wind, there was little flying, but one pilot got to Baghdad and made a careful reconnaissance. He reported three lines of partly constructed trenches along the right bank of the Diyala river, with redoubts between the river and the road. On the same day the III Corps reached Aziziya, where a halt was made to give time for the extended lines of communications to be reorganized for the further advance. The I Corps closed to the front, clearing the battle-field as it proceeded.

¹ *In the Clouds above Baghdad*, p. 89.

Great quantities of abandoned material lay scattered along the eighty miles over which the Turks had retreated under pressure, and marauding Arabs, in search of loot, descended on the area and had to be dealt with. Since the crossing of the Tigris, 4,000 prisoners, 39 guns, 22 trench mortars, 11 machine-guns, vessels, barges, pontoons, and general military stores had been captured.

By the 3rd of March No. 30 Squadron, with fourteen aeroplanes, was concentrated at Aziziya. The workshop barges, which proceeded upstream from Shumran on the same day, found abandoned, about twenty miles up-river from Bughaila, the old Royal Flying Corps barge which had been lost at Kut, and in it were two aircraft engines in good condition, some bombs, and miscellaneous aeroplane stores.

The advance was resumed on the 5th from Aziziya. The infantry reached Zor, after a march of eighteen miles, and the cavalry got to Lajj, seven miles farther on, where the Turkish rearguard was found and attacked in a dust-storm which made the fighting confused and rendered air co-operation difficult. Air reconnaissances were made of the country between Lajj and Baghdad, and messages giving some information of the enemy's dispositions were dropped on the cavalry and on III Corps columns. The aeroplanes flew forward to Zor from Aziziya, but two of them were wrecked on landing in the gale. Next day the forward march was continued with little opposition, and the strong Ctesiphon positions, found unoccupied, were passed. The gale had not died down, but air reconnaissances of the Diyala positions and of Baghdad were again successfully made.

On the 7th the advanced front came in contact with the enemy along the Diyala river line which the air observers had reported in some detail. As guns were brought forward they were directed from the air on the enemy entrenchments and battery positions. There was an interesting attempt to cut the railway north of Baghdad in order to prevent the enemy from evacuating his guns and military stores towards Samarra. Two officers of the Royal Engineers, carrying charges of dynamite, were piloted by

Lieutenants J. S. Windsor and R. K. Morris to a bridge at Sumaika, forty miles north of Baghdad. A good landing was made near the bridge, but Arab horsemen appeared before the engineer officers could reach the structure. They realized that the charges of explosive they carried would be insufficient to destroy the bridge, which proved to be built of reinforced concrete, and that there was in any event little chance of effecting their mission with the Arabs riding down on them, and they therefore rushed back to the aeroplanes, which got safely into the air. The two pilots thereupon scattered the party of Arabs with machine-gun fire.

After sunset on the 7th of March pontoons which were launched in an attempt to get a footing on the right bank of the Diyala were heavily fired on and they went drifting downstream filled with British dead and wounded. Next day a bridge was thrown across the Tigris, below the Diyala mouth, and cavalry and infantry were passed across to attack Shawa Khan, where entrenched positions, reported by air reconnaissance, covered Baghdad from the direction of the Euphrates valley. Shawa Khan was taken, with little opposition, on the morning of the 9th, and the air observers reported that the Turkish rearguard had occupied another strong position a mile and a half to the north-west, and about six miles south of Baghdad. This position was still being attacked when night fell, but the Turks went back in the darkness and were engaged, on the morning of the 10th, about three miles from Baghdad railway station.

The work of the Royal Flying Corps during these days of fighting before Baghdad was again reconnaissance and a limited amount of artillery co-operation, but on the 9th a few bombing attacks were made on the German aerodrome at Baghdad and on Turkish troops and camps in the neighbourhood. Major de Havilland was partly successful in blocking the railway north of Baghdad. He obtained a hit on the station at Al Kadhimain with a 65-lb. bomb which partly wrecked a train: forty-seven bombs in all were dropped throughout the day.

The Turkish rearguard, south of Baghdad station, was

attacked in a dust storm, but it was not until midnight on the 10th that the enemy retired. Meanwhile, on the Diyala front, a bridge had been thrown across by noon, and at nightfall, after heavy fighting, the troops on this front were in touch with the Turks in their last position covering Baghdad from the south-east along the Tel Muhammad ridge.

Early on the morning of the 11th of March, Baghdad was entered amid signs of welcome from the inhabitants, who had for some hours been at the mercy of looting mobs of Kurds and Arabs. Although for a fortnight the Turks had been removing military stores from the city, quantities of damaged and undamaged material were captured. No. 30 Squadron, which had moved to Bustan on the 8th, flew on the 11th to the former German aerodrome at Baghdad, where were found thirteen engines in fair condition—six of them Royal Flying Corps engines which had been lost at Kut—and a wrecked Albatros aeroplane. At Kadhimain were found also four more damaged Albatros aircraft.¹ On the Albatros lying on the Baghdad aerodrome was a painted message: 'With kind regards to our British comrades: the German airmen', and on the fuselage had been written: 'God save the King.'²

In the advance which ended in the capture of Baghdad—an event of moral importance in the war—the one available squadron of the Royal Flying Corps had exerted an appreciable influence. It gave help, at critical times, to the artillery, and inflicted material and moral damage as a result of its sporadic bombing of the enemy troops and lines

¹ These, which had been packed ready for removal by train, had been damaged by German mechanics when, at 6.30 a.m. on the 11th, rumours had been received of the approach of British cavalry.

² A German account says: 'The Army retreated in wild and indescribable confusion. The airmen had to fight a rearguard action. Every piece of their transport was lost along with all the rest of their *matériel*, and consequently the machines, for which there was now no longer any petrol, had to be burnt. And still the retirement continued. In order to relieve the pressure of the pursuing English forces to some extent, our airmen blew up bridges, drove locomotives, in short, did every kind of technical work which was required.' (Neumann, *The German Air Force in the Great War*, Eng. trans., p. 262.)

of communication, but the outstanding feature of its work was reconnaissance. The country, flat and monotonous, offered no vantage points from which the Turkish positions could be viewed from the ground, but, on the other hand, it afforded the enemy no scope to conceal his dispositions from the air observers. At the beginning of the advance the Royal Flying Corps pilots had quickly asserted their superiority and they had flown thereafter without serious opposition. The British troops went forward with the knowledge that, to Baghdad and beyond, the Turkish dispositions and movements could not be hidden from the British aeroplanes. Air superiority, with all that it implies, is a condition about which attacking troops are acutely conscious, and the knowledge that they, and not the enemy, have that superiority makes a difference to their confidence. In the advance to Baghdad the pilots and observers did all that was asked of them, but their work would not have been possible without the untiring spirit and skill displayed by the air mechanics and by the transport personnel. The aeroplanes were kept serviceable under the most primitive conditions and in face of extreme climatic and physical difficulties.

Baghdad and Beyond

[Maps, pp. 249 and 324]

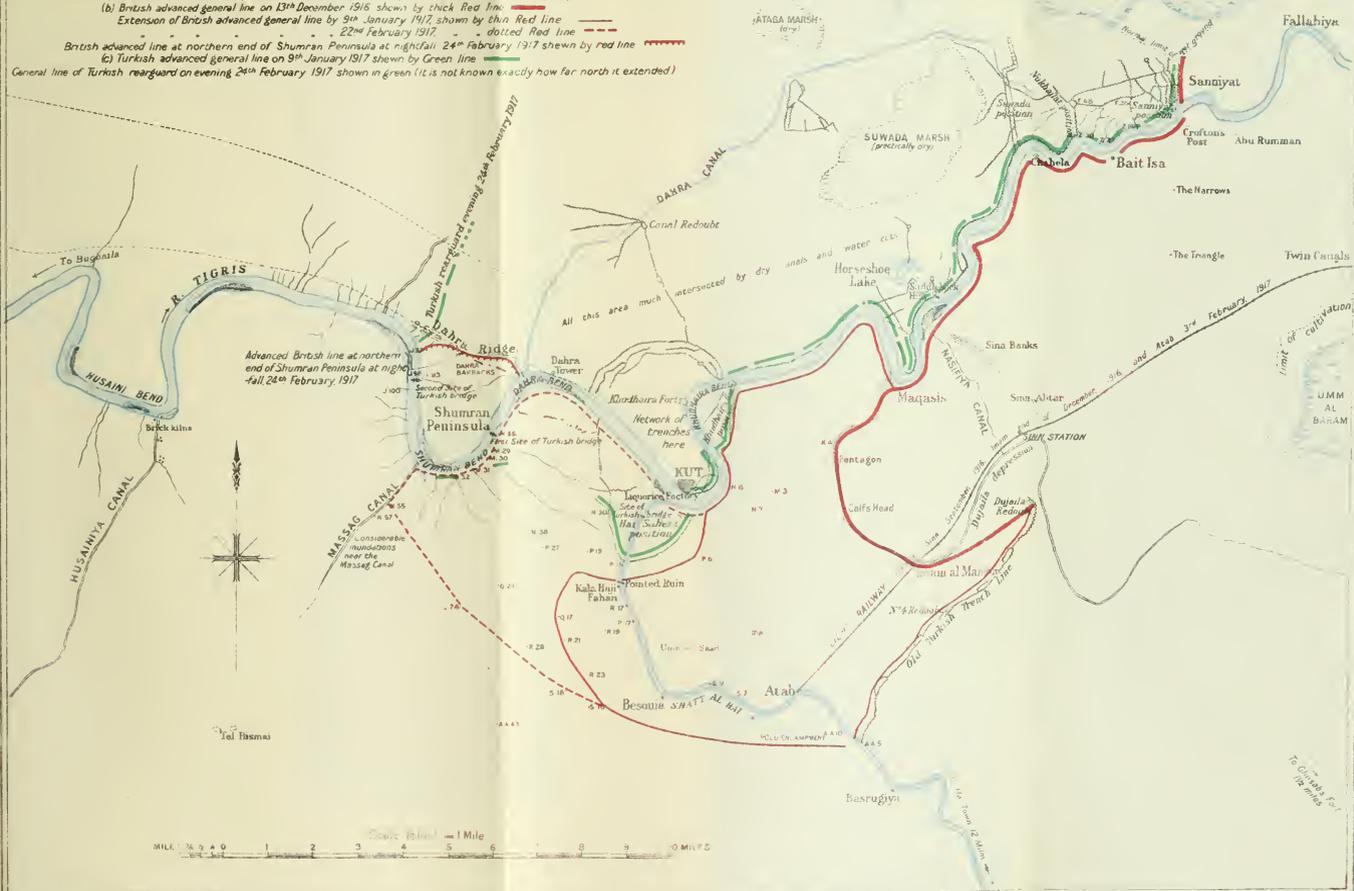
There could be no pause after the fall of Baghdad. In January 1916 a Russian force of one infantry division with Cossack cavalry, under General N. N. Baratoff, had captured Hamadan on the Persian plateau and thereafter, with a view to helping the British attempt to relieve Major-General Townshend in Kut, had pushed rapidly westwards. Russian patrols had got as far as Khanaqin, on a tributary of the Diyala river 120 miles from Baghdad, when the fall of Kut had put an end to the adventure and Baratoff had been forced to withdraw. The Turkish XIII Corps, advancing up the Diyala, had, by the summer of 1916, driven him back to the Persian table-land, east of Hamadan.

The advance of Major-General Maude to Baghdad in 1917 brought about a change in the situation in Persia.

TO ILLUSTRATE OPERATIONS ON THE TIGRIS... 13TH DECEMBER 1916, TO 25TH FEBRUARY 1917.

NOTES. (a) For detail of trenches etc. in the Hai Salient, Dohra Bend, and Shumran Peninsula, see Map 23.

(b) British advanced general line on 13TH December 1916 shown by thick Red line.
 Extension of British advanced general line by 9TH January 1917 shown by thin Red line.
 22ND February 1917 shown by dotted Red line.
 British advanced line at northern end of Shumran Peninsula at nightfall 24TH February 1917 shown by red line.
 (c) Turkish advanced general line on 9TH January 1917 shown by Green line.
 General line of Turkish rearguard on evening 24TH February 1917 shown in green (it is not known exactly how far north it extended)



When Major-General Maude had entered and passed Kut, on the 24th of February 1917, the Turkish XIII Corps had fallen back from Hamadan and, when Baghdad fell, was in Kermanshah with the Cossacks on its heels. The Turks were aiming to reach Khanaqin, and one of the tasks of Major-General Maude was to send out a strong column to capture the town before the Turkish XIII Corps could arrive.

He had also, in order that Baghdad might be made secure, to pursue his old opponents, the Turkish XVIII Corps, which had retreated north of the city, and to drive it from the area of the river dams, which, with the approach of the flood season, it was essential the British should control. It was, furthermore, necessary to capture Falluja, on the Euphrates west of Baghdad, and so sever the Turkish communications along that river, as well as to obviate any possibility that the Turks might cut the Euphrates embankments and flood the country. Major-General Maude therefore, immediately Baghdad had been captured, divided his forces into four columns, one to follow the Persian road up the Diyala valley to Khanaqin, another to move westwards to Falluja, and two to advance along either bank of the Tigris.

Air reconnaissances on the 11th of March—the day Baghdad was captured—reported the Turkish rearguard entrenched between the right bank of the Tigris at Hassaiwa and the railway. The observers estimated the force at 4,000 troops, with railway transport, but farther north, at Mushahida station, a body of about the same strength was encamped. On the morning of the 14th the Turkish position was attacked, but before the infantry and cavalry advanced two aeroplanes flew over the Turkish defences and the air observers surveyed and sketched the enemy positions. The pilots landed at the I Corps headquarters, and the air sketches and reports were sent forward immediately to the advanced guard. After a day of stubborn fighting, in scorching heat, the Turkish rearguard had been completely defeated and, by midnight, the right bank of the river had been cleared of the enemy as far as Mushahida station, which was in British hands.

The aeroplanes, which could be landed without difficulty on the hard flat surface on the river borders, kept the Corps staff in touch with the action throughout the day and the observers indicated, by personal reports, many targets to the artillery. When the Turks knew they had been defeated they went back rapidly and touch with them was lost. Air reconnaissances on the 15th were hampered by gales and dust storms, but on the 16th the observers reported that there were no enemy troops within twenty-five miles of Mushahida, and that for still another twenty miles to the north there were only stragglers. It was not, however, desirable that the pursuit of the Turks should be continued on the right bank of the Tigris until the left bank had been cleared.

The column which set out to capture Falluja was equally successful and the town was occupied on the 19th of March, the Turkish troops retiring towards prepared positions at Ramadi. Daily air reconnaissances for a week before Falluja was taken surveyed the whole area, especially the flooded districts, and, on the 19th, when the town was entered, air reports kept the commander of the column in touch with the progress of his troops.

Major-General Maude's attempt to occupy Khanaqin was defeated by the skilful tactical handling of the Turkish XIII Corps. On the 15th of March the Diyala column, under Major-General Sir H. D'U. Keary, left Baghdad and, after a surprise crossing of the river on the night of the 17th/18th, took the village of Baquba on the morning of the 18th. The occupation of this centre closed one line of retreat to the Turkish XIII Corps by way of the mountain path from Harunabad through Mandali. Air reconnaissances of the Baquba area had been made for some days before the Diyala column occupied the town. On the morning of the 19th of March an air observer reported that 500 Turks were moving on Baquba from Shahraban, and that another 1,500 were approaching Shahraban from Qizil Ribat. General Head-quarters concluded that the mission of these reinforcements was to seize Baquba in order to cover the retreat of the Turkish 2nd Division at Khanaqin, and Major-General Maude therefore instructed

Major-General Keary to conceal his strength and allow the Turks to come on until he could deal rigorously with them.

On the 21st an early aeroplane reconnaissance¹ reported that about 1,000 infantry with transport were crossing the Diyala at Lambarak, a movement which led Major-General Maude to conclude that the enemy intended to get to the Delli Abbas-Kifri road and so continue his retreat towards Kirkuk.² Major-General Keary was thereupon ordered to make contact with the Turks and hold them to their ground. Afternoon air reconnaissances found a column, 2,000-3,000 strong, approaching Qizil Ribat down the Khanaqin road, with other small columns and encampments in the area. Two miles south of Shahraban the Turks appeared to be holding an entrenched position.

Major-General Keary moved forward, but, owing to the numerous canals and streams which had to be bridged, his advance was slow. On the 23rd he was ready to make a frontal attack on the Turkish covering troops entrenched south of Shahraban, but in the early hours of the 23rd the Turks withdrew and Shahraban was occupied without opposition at 7 a.m. It had been expected that the Russians would reach Khanaqin on the 22nd, and an aeroplane had been sent out on that day to find them, but the observer had failed to discover any trace of them: it was known later that the Russians had been delayed by snowdrifts in the Pa Yi Taq pass.

When the Turkish covering force fell back on the 23rd from Shahraban, it took up a line of prepared positions farther north on the Jabal Hamrin ridge to cover the approaches to the Kifri road. These positions were attacked on the 25th, but the broken nature of the country made operations difficult and, as the Turks were well entrenched and in some strength, there was little progress.

¹ On the 20th 'B' Flight moved to Baquba to work directly under Major-General Keary. Two aeroplanes flew to Baquba on the 20th and another on the 23rd.

² It is now known that the enemy was only moving supplies across the river.

It had by now become clear that the safe passage of the Turkish XIII Corps across the Diyala was assured, and it soon became evident that the enemy intention was not to move the XIII Corps back to Kifri, but to send it towards the Tigris, where it could join up with the Turkish XVIII Corps. Owing to the nature of the country, a tumble of hills and nullahs intersected by canals, air reconnaissance reports during the operations of Major-General Keary's column could give only a general impression of the Turkish strength and movements. In the featureless desert country over which the aeroplanes had flown during the advance to Baghdad, the few available observers, in spite of the rapid changes in the situation, had had no difficulty in following and reporting the operations. In the broken Diyala country the same results could not be obtained from rapid visual observation.

On the 2nd of April Lieutenant-Colonel J. E. Tennant set out from Baghdad in a Martinsyde to find the Russian force and deliver a dispatch from Lieutenant-General Maude to General Baratoff. In the Pa Yi Taq pass he discovered a party of Cossacks and he landed beside them, delivered his package, and then flew back to Baghdad. On the same day a small British column, which had pushed out to Qizil Ribat, met a Cossack patrol which had been sent forward to establish contact. Within a few days the Russians had taken over the line of the Diyala, and Major-General Maude thereupon withdrew Major-General Keary's column for operations up the Tigris towards Samarra against the Turkish XVIII Corps.

Two columns were concentrated on either bank of the Tigris, each with one Flight of aeroplanes. For work with the right bank column, 'B' Flight of No. 30 Squadron was transferred from Baquba to Fort Kermea on the 8th of April, while 'C' Flight, which had been at Kasirin since the 29th of March, moved to Kuwar Reach, the riverhead for the left bank column, on the 7th of April.

The German air service, which had suffered the loss of its aeroplanes and material during the advance to Baghdad, again became active at the beginning of April. Nine new fighters (presumably Halberstadts and Fokkers)

had been brought back from Germany by the air service commander on this front, who had made a journey home to speed up supplies,¹ and, on the 3rd of April, one of them, a Fokker, attacked a reconnoitring B.E.2c. In a brief combat the two aeroplanes hit one another, wing-tip to wing-tip. The Fokker fell out of control, but was righted and flown back to Samarra, while the damaged B.E.2c reached its aerodrome at Kasirin. The German wireless announcing the combat, stated: 'Our aeroplane brought back a wing torn off the enemy plane and landed safely in our lines.'

With the appearance of the new enemy fighting aeroplanes, which were better than anything possessed by the Royal Flying Corps on the front, it was clear that No. 30 Squadron might have difficulty in maintaining its work of co-operation with the army. It had been foreseen that the German air service would be re-equipped, and requests had been sent to the War Office asking for up-to-date fighters. Some Spads had been promised, but as it would take some time to transport them from England, a few Bristol Scouts were meanwhile transferred from Egypt as a temporary measure. As soon as the Bristol Scouts arrived at Basra from Egypt, the Aircraft Park at the base port hurriedly assembled them for service. Two were flown to the front from Basra (a distance of 750 miles) on the 5th and 17th of April.

On the 8th of April the column on the right bank of the Tigris attacked the Turkish positions covering Balad station, which was captured after a sharp engagement.

¹ 'In the meantime I myself had been to Germany to speed up the delivery of fresh supplies. I returned to Irak in April, 1917, with nine new Scouts. In order to confound the English by the unexpected appearance of a new type, I covered the 300 odd miles from the railhead of the Baghdad line to the front in one day. But even this rapidity was of no use. On the same day an English machine appeared at a great height and dropped a tin of cigarettes with the following message: "The British airmen send their compliments to Captain S. and are pleased to welcome him back to Mesopotamia. We shall be pleased to offer him a warm reception in the air. We enclose a tin of English cigarettes and will send him a Baghdad melon when they are in season. *Au revoir*. Our compliments to the other German airmen. The Royal Flying Corps."' (Oberleutnant Schüz in *The German Air Force in the Great War* (Neumann), pp. 262-3.)

Next day Harba, farther along the railway in the direction of Samarra, was occupied, but there followed a halt until the column on the left flank could make progress. The intention was that this column should force the Shatt al Adhaim and drive the Turks holding the river towards Samarra, but on the 8th of April, Lieutenant-General Sir W. R. Marshall, the officer commanding the column, was informed by General Head-quarters that air reconnaissances had disclosed movements of the Turkish XIII Corps from Delli Abbas in a south-westerly direction, and that these movements must be carefully watched. The Cavalry Division maintained close watch on the enemy in the Delli Abbas area, and early on the morning of the 9th, patrols from the division were in contact with Turkish infantry moving in the direction of Diltawa. The cavalry delayed the advance of the enemy troops who, about noon, took up position along the line they had reached north of the Khalis canal about Tjindari. Lieutenant-General Marshall decided to transfer the bulk of his force to strike at the right flank of the enemy. This movement took place on the night of the 10th and, next morning, the Turks were taken in flank, and before evening were in full retreat. 'C' Flight had moved to a landing-ground at Sindiya, and air reconnaissances and flights to observe for the fire of the artillery were made throughout the day. From the 12th to the 14th the Turks fought a stubborn rearguard action in a position, south of Delli Abbas, which had been reported from the air, but on the 15th Delli Abbas was entered and the enemy troops fell back on the Jabal Hamrin range, but they were not pursued: 'C' Flight returned to Kuwar Reach the same day.

A B.E.2c (pilot, Captain C. L. Pickering, observer, Lieutenant H. W. Craig) which set out on the 15th to reconnoitre Samarra, where the German aerodrome was situated, did not return, and it was known afterwards that it had been shot down in a fight with a Halberstadt and that the two officers had been killed. This old B.E.2c, numbered 4500, warped, scarred, and patched, and no match for a fighter of the Halberstadt type, had had a remarkable career in Mesopotamia. She had seen her first service in the battle

of Ctesiphon in 1915, had been flown out of Kut on the day the siege began, and thereafter, except for brief periods when she was being overhauled, had been flown over the battle-fields to Baghdad and beyond. Exposed without cover to sun, wind, rain, and sand, she had never failed her pilots and had become something of an institution.

The time had come for the final advance on Samarra. Lieutenant-General Marshall was ordered to leave sufficient troops to contain the enemy in the Jabal Hamrin positions, and to assemble a column at Duqma for an advance across the Shatt al Adhaim. Air reconnaissances on the 17th of April reported the Adhaim positions in detail, and the observers made sketches of the Turkish entrenchments and of the river bed.¹ On the night of the 17th the river was crossed and next day, in blazing heat, the Turkish forces were attacked and defeated, air observation of the artillery and ships' fire contributing to the success.²

The enemy troops retired in disorder and, by 5.40 p.m. on the 18th, had gone back fourteen miles. Meanwhile there was intense activity on the right bank of the Tigris, where the British column was at Istabulat awaiting the order to push forward. The Turkish defences confronting this column were surveyed from the air and were shown to be formidable.³ On the 21st of April the observers were much hampered by enemy aeroplanes, and when these retreated the heat prevented further work in the air. As a result the British counter-batteries were unable to deal effectively with the Turkish guns, which continued throughout the day to shell the British infantry heavily. The infantry, nevertheless, pressed forward up to noon,

¹ An artillery report says: 'Captain G. Merton carried out reconnaissance of the Adhaim position, bringing back information which greatly assisted compilation of bombardment tables.'

² A telegram from the III Corps artillery to the Royal Flying Corps said: 'Many thanks from gunners for most valuable co-operation to-day. Three successive planes put in excellent work.'

³ 'B' and 'C' Flights and the head-quarters of No. 30 Squadron moved to Barura on the river east of Istabulat station on the 20th. 'A' Flight remained at Baghdad under the orders of General Head-quarters.

when, owing to the strong opposition and to the sweltering heat, they were ordered to consolidate their gains preparatory to a renewal of the attack when the weather became cooler. On the 22nd the advance was resumed and the final Turkish position covering Samarra was captured. While the fighting was in progress on the ground on the 22nd, there was an air duel, in full view of the troops, between a Bristol Scout (pilot, Lieutenant M. L. Maguire) and a Halberstadt, and the enemy aeroplane eventually shed its wings and crashed behind Istabulat.¹

The Turks retired during the night of the 22nd/23rd of April and early air reconnaissances on the 23rd reported no sign of enemy troops on either bank of the Tigris for a distance of five miles north of Samarra, and that the town appeared deserted. A message giving this information was dropped on the advanced troops at 8.45 a.m. and Samarra was entered, without opposition, at 10 a.m.

Meanwhile it had become clear that the Turkish XIII Corps was about to attempt a counter-stroke against the British right flank. An observer who flew over the Shatt al Adhaim on the evening of the 20th of April had discovered about 1,200 Turks with transport on the right bank of the river. Next morning this force was reported, from the air, as moving in three columns in a south-westerly direction. Defensive measures were taken, but, until the XVIII Corps at Samarra had been defeated, no offensive action could be contemplated. With the rout of the Turkish XVIII Corps on the 22nd and 23rd, however, it became possible to turn attention to the XIII Corps. On the 23rd air observation revealed the head of the Shatt al Adhaim column at Tulul en Nor, on the right bank of the river, and a second large force of all arms, about 4,500 strong, moving south-west, seventeen miles behind the first column. The defeat of the Turkish XVIII Corps on the Tigris, of which the XIII Corps staff presumably became aware during the day, apparently caused a change of plans, because an air reconnaissance at 5 p.m. on the 23rd reported that the leading column on the Shatt

¹ Lieutenant Maguire was shot down, wounded, on the 28th of April and died as a prisoner of war.

al Adhaim had halted and was entrenching a position at Dahuba, which was sketched from the air. The position was attacked next day, the 24th, and the Turks, defeated, retired rapidly to Band-i-Adhaim, in a defile where the river issues from the hills. The new line of entrenchments was reconnoitred from the air, and, on the 30th, was attacked during a fierce dust storm which prevented flying until 4 p.m., when an air observer directed the fire of a battery against the enemy whom he reported to be retiring. During the night the Turks evacuated all their positions and went back once again into the Jabal Hamrin hills.

Baghdad was now secure. The two defeated Turkish army corps had been driven back on divergent lines, the XIII into the Jabal Hamrin fastnesses and the XVIII to Tikrit. In the final weeks of the advance the operations had taken place in a sweltering heat. The aeroplanes, most of them warped and worn by their service during the long advance, had had to cover a wide area in the final phase and, although flying was confined whenever possible to mornings or evenings, it had often been necessary to send up the aeroplanes in the full blaze of the noonday heat:¹ many of them badly needed overhaul, and two Flights of No. 30 Squadron were therefore concentrated at Baghdad. The remaining Flight was kept at Sindiya, with six B.E.2c's and two Bristol Scouts, for general reconnaissance of the Turkish positions.²

Summer Operations

[Maps, pp. 249 and 324]

Throughout the summer, which was abnormally hot, there could be little military activity. The positions which had been gained in April were strengthened and held, but the majority of the troops were withdrawn into reserve in camps along the river banks, where they would be able to obtain a measure of rest.

¹ Aeroplanes of No. 30 Squadron flew 335 hours during April.

² This Flight moved downstream to Jadida in June. The river had fallen and the move was a precaution against the Flight workshops and stores barge becoming beached until the autumn.

During the summer the aeroplanes of No. 30 Squadron, flying before 9 a.m. and after 5 p.m., photographed hundreds of square miles of enemy territory, and from the photographs maps were compiled which were used when active campaigning began again in the autumn. Courses of instruction for pilots and observers, which covered all forms of co-operation by aeroplanes with other arms in accordance with the latest developments in England and France, were given at Baghdad. There were also lectures for artillery officers on the developments in aircraft co-operation.

There were a few minor air operations in the summer months. Towards the end of June, in retaliation for an ineffective bombing attack by German airmen on Balad, Baquba, and Samarra, the camps of the Turkish XVIII Corps at Tikrit were attacked by six pilots, who hit tents with some of their twenty-four 20-lb. bombs. At the same time two Martinsydes bombed a ship previously reported by reconnaissance to be aground north of Tikrit. Of eight 65-lb. bombs dropped, one blew in the side of the vessel, while another exploded in a nearby dump.

On the 15th of June, the head-quarters of the Royal Flying Corps in Mesopotamia was re-formed as the Thirty-First Wing, which remained under the general administrative orders of the Middle East Brigade. The advanced Aircraft Park was brought forward from Shaikh Saad to Baghdad.

In July a minor operation with the object of tightening the hold on the Euphrates was attempted. The Turkish advanced positions at Dhibban were captured on the 8th, but an attempt on the Ramadi lines made on the 11th failed, chiefly because of abnormal heat and a blinding dust storm. Four aeroplanes co-operated in the Ramadi operations during the early morning, mainly with the artillery. The shade temperature on this day reached 121° (Fahrenheit) and three aeroplanes which had set out at 4.30 a.m. to bomb the Turks in Ramadi were forced down because the water in their engines had boiled away and the pilots were sick with heat.

When the operations on the Euphrates had begun, on

the 7th of July, two German aeroplanes had flown over the Falluja area on reconnaissance. Aeroplanes sent out to cut off the German pilots from their aerodrome at Tikrit never saw them, and it was presumed the Germans had landed at Ramadi and would fly on next day. It was reported next morning, the 9th, that they had left Ramadi, but air patrols again failed to find them. On the 10th, when the thermometer was registering a shade temperature of 122° F., two exhausted German aviators stumbled into Samarra and told their story. Soon after leaving Ramadi one of the aeroplanes—an Albatros two-seater—had been forced to land through engine failure due to the heat. The other had landed alongside and, after the first Albatros had been set on fire, the pilot and observer had been flown away on the wings of the second. With its load of four persons, however, the German aeroplane would not go higher than 400 feet, and at this height it was impossible to keep the engine cool, and a landing became necessary. The four Germans sought shelter from the heat under the wings of the aeroplane until 6.30 p.m. when an attempt to 'taxi' the Albatros to the Tigris was made. The engine, however, again gave trouble, and eventually the aeroplane was burnt and the four airmen set out for Samarra on foot. Two of them collapsed on the way, but the others reached the British picquet line on the morning of the 10th. Armoured cars and cavalry were at once sent out to rescue the two missing Germans, but they were never found.

In June the Russians, because of the heat, had left the Diyala river line and had gone back into the hills towards Kermanshah, and the British had been forced to reoccupy Balad Ruz. Regular air reconnaissances were made over this front, and when, on the 7th of August, an observer reported that the Turks were entrenching a new position south-west of Shahraban, Lieutenant-General Maude decided to send columns forward from Balad Ruz and Baquba to reoccupy Shahraban. The columns set out on the night of the 18th/19th of August and, after slight opposition, took possession of Shahraban on the 20th and established a new line. The Turks, whose positions and

movements had been reported from the air during this minor operation, retreated into the Jabal Hamrin hills whence they had come.

The aeroplanes were effectively used from time to time during the summer to overawe tribesmen who were surreptitiously aiding the enemy or actively impeding the British forces. Occasionally native villages were attacked with bombs and machine-gun fire, but usually peaceful demonstrations by aircraft over the tribesmen sufficed to bring about a change of attitude.

On the 13th of August No. 63 (R.E.8) Squadron arrived at Basra from England under the command of Major J. C. Quinnell. The squadron had come from the bleak coast of Northumberland and it reached Basra at a time when the most intense heat-wave for many years was at its peak. Many of the officers and men had seen service in France and they were well trained and of good physique, but most of them fell victims to the climate and to the pestilences of the Persian Gulf. Sandfly fever, heat-stroke, and other ailments took heavy toll and, within a short time, of 30 officers only 6 remained and of 200 men only 70. Three men had died and the remainder were in hospital, while even the remnant were too badly shaken to do much. Thirty, broken in health, were eventually invalided to India without having seen anything more of Mesopotamia than Basra. It was some weeks before the aeroplanes and stores could be disembarked. The aeroplanes had to be erected in the open on the aerodrome at Tanouma on the bank of the Tigris opposite to Basra. Some temporary hangars, made of matting, were built by the Royal Engineers to give protection from the sun, but strong gales partly demolished the improvised hangars after a few days, and the torn roofs, wrapping themselves round the aeroplanes, caused serious damage. Difficulty arose through the warping of spars and other wooden parts, and wings and fuselages had to be stripped to remedy the defects. The spruce engine bearers were found to split in the great heat and new ones of ash had to be made in the workshops. These happenings caused delay, and it was not until the second week in September that a small

advanced party could be mustered and sent to Samarra to prepare an aerodrome. The first R.E.8 of the squadron reached Baghdad on the 14th of September and the second two days later: during October the remaining aeroplanes made their way to the front by Flights. The ill luck which No. 63 Squadron suffered in the early stages continued when the first reconnaissance of the Turkish lines was attempted. On the 25th of September the two recently arrived R.E.8's left Baghdad to reconnoitre the Turkish positions at Tikrit, but they failed to return. It was known afterwards that they had met a German Halberstadt fighter over Tikrit, and that as one of the British pilots was diving to attack the enemy the wing extensions had folded back and the R.E.8 had crashed. At the same time the engine of the second R.E.8 failed, and the pilot had been compelled to land. The squadron lost a third aeroplane on the 5th of October. On the 21st of October Major Quinnell was posted to England and the squadron was left in temporary command of Captain F. L. Robinson. It was eventually taken over, on the 10th of November, by Major R. A. Bradley, who came from Egypt but had taken part in the original flying operations before and after the fall of Kut and therefore knew the country and its conditions well. By the time Major Bradley arrived, No. 63 Squadron was concentrated on the aerodrome at Samarra: two of its Flights were equipped with R.E.8's for reconnaissance, while the third had Spads, Bristol Scouts, and Martinsyde Scouts, for fighting.¹ It was not long before the squadron was ready and eager to play its full part in the operations, and its subsequent record was a fine one.

Fighting on three Fronts

[Maps, pp. 249 and 324]

Meanwhile, with a fall in the temperature in September, the campaigning season had opened with a brilliant attack on Ramadi. The main work of the Royal Flying Corps had already been accomplished when the operations began.

¹ During the autumn the old B.E.2c's of No. 30 Squadron were gradually replaced also by R.E.8's.

That work had been photography of the Turkish positions covering Ramadi, supplemented by visual reconnaissances and by sketches. Since the abortive attack in July, the Turks had strengthened their defences and had reinforced their troops on this front. 'B' Flight of No. 30 Squadron, with a photographic section, had moved to Falluja on the 21st of September, five days before the attacking force had been concentrated at Madhij. From the air reports it was made clear that the Turks attached importance to the defensive advantages of the Mushaid ridge, four miles east of Ramadi. Along this ridge the enemy held an advanced position to cover his main defences which ran in a semicircle round Ramadi.

Major-General Sir H. T. Brooking, in command of the Ramadi operations, made his dispositions to lead the enemy to believe that the main attack would be directed against the Turkish left on the Euphrates. His intention, however, was to make his principal attack on Ramadi from the south, while he moved his cavalry across the Aziziya canal to cut the way of retreat to Hit. The columns—two infantry and one cavalry—moved out from the British starting-point at Madhij in the evening of the 27th of September. On the previous day 'B' Flight of No. 30 Squadron had moved forward to Madhij, from which place it operated during the battle.

By nightfall on the 28th the Turks at Ramadi were completely encircled with their backs to the Euphrates, across which there was no bridge. The British movements throughout the day were reported by contact-patrol observers who dropped message-bags from time to time on the divisional head-quarters, while extended air reconnaissances kept watch for sign of any Turkish reinforcing movements, particularly from the direction of Hit. At 3 a.m. on the 29th, in an attempt to break through the net, the Turks attacked the cavalry astride the Hit road, but they made no impression. At 6.15 a.m. the British infantry assault began, south of Ramadi, and by 11 a.m. the battle was over and the whole Turkish force had surrendered. The captures included 3,454 prisoners, 13 guns, 12 machine-guns, launches, barges, ammunition,

and stores. The action at Ramadi affords an example of an encircling operation perfectly planned and executed, and the plans were based on the photographic and reconnaissance information supplied by the Royal Flying Corps.¹

While the Ramadi victory was being won, a cavalry column, on the right wing of the Baghdad army, moved out from Balad Ruz and occupied Mandali on the morning of September the 29th. This centre had, for some time, been used by the Turks as a supply station, and it formed a potential base for a flank attack. In October Major-General Maude continued to strengthen his position on the Diyala front. In operations between the 18th and 20th of October the enemy was driven from the left bank of the Diyala into the Jabal Hamrin hills, and the town of Qizil Ribat was occupied. On the 18th 'C' Flight and the head-quarters of No. 30 Squadron had moved from Baghdad to Shahraban to take part in these operations and, in addition to the usual reconnaissance and contact-patrol work, pilots and observers made low-flying attacks against the retreating Turks.

No German pilots had appeared over the Ramadi front while the operations which resulted in the capture of the town were in progress, but on the Diyala front, as well as along the Tigris, enemy aeroplanes were reported from time to time during October. In reply to this increased activity, three Martinsydes bombed the German aerodrome at Kifri on the 16th of October, but without inflicting serious damage. One of them, with a bullet through the petrol tank, was forced down, but the pilot was picked up, after the Martinsyde had been burnt, by Lieutenant J. B. Welman in one of the other bombing Martinsydes.

After the operations of the 19th of October, the Flight of No. 30 Squadron at Shahraban was withdrawn to Baquba, where it was joined by a second Flight of the squadron from Baghdad.² The squadron settled down to systematic reconnaissance and photography of the Jabal

¹ All the reconnaissances, except those of a strictly local nature, were made by air.

² 'B' Flight of No. 30 Squadron remained at Falluja on the Euphrates.

Hamrin area and also made occasional bombing raids. Military operations had usually been preceded by air attacks on the enemy aerodrome opposite the front to be attacked. On the 31st of October, when the I Corps was about to attack on the Tigris front, six aeroplanes made a bombing raid on the Kifri aerodrome on the Diyala front with the object of deceiving the enemy. One German fighter, which ascended as soon as the bombers appeared, so damaged a B.E.2c that the pilot, Second Lieutenant A. P. Adams, was forced to land. The leader of the formation, Lieutenant F. Nuttall, in a Martinsyde, went down to pick up the stranded pilot. Many Turks were in the neighbourhood, but Second Lieutenant Adams, who had destroyed his aeroplane, jumped on Lieutenant Nuttall's Martinsyde as it was being taxied along, and the two got into the air again after a burst of machine-gun bullets had been fired to scatter a party of Turkish troops in the way: the two officers reached their aerodrome safely. The pilot in another Martinsyde, Lieutenant J. B. Welman, was wounded in combat and forced to land on the German aerodrome at Kifri. A third Martinsyde was forced down by a hit from an anti-aircraft shell. The pilot, Lieutenant C. Cox, landed safely eighteen miles inside enemy territory, burnt his aeroplane, and then set out on foot for the British lines. He successfully eluded Turkish patrols and covered the eighteen-mile journey to safety in $6\frac{3}{4}$ hours.

Meanwhile the centre of military interest had shifted to the Tigris. On the 22nd of October the 7th Division reported that a reconnaissance patrol, which had marched out from Samarra, had been fired upon north of Al Ajik, and No. 63 Squadron was thereupon requested to find out what this Turkish activity portended. The air reconnaissance, made in the afternoon of the 22nd, reported about 2,000 Turkish troops at Huwaislat, eight miles north of Samarra, with another 2,000 and artillery in the valley behind them. Later the same day it was seen from the air that the enemy troops were entrenching in the Huwaislat area. It seemed clear that the Turkish XVIII Corps intended to strike at Samarra, and Major-General

Maude decided to attack before the enemy had time to elaborate his entrenchments. The 7th Division moved forward on the night of the 23rd/24th, but the Turks left their positions at Huwaislat and withdrew rapidly to Daur, their movements being reported by No. 63 Squadron. The Daur positions were attacked and captured on the 2nd of November and the enemy went back to Tikrit, forty miles north of Samarra, where air reconnaissances reported that prepared defensive positions were held in force. Next day the positions covering Tikrit were shelled by heavy artillery, with the help of air observation, but when it appeared that the Turks intended to make a stand, orders were given to the British troops to withdraw to Samarra on the 4th. Air reconnaissance on the 3rd and 4th, however, indicated that the camps in the Tikrit area were being reduced in size and seemed to confirm reports sent in by agents that the Turks intended to evacuate the town. As a result, the instructions for withdrawal were cancelled and instead an advance to occupy Tikrit was ordered. The attack was made on the 5th and, after heavy fighting, resulted in the rout of the enemy, who retreated to a position astride the river at Fat-Ha with an advanced post at Shuraimiya. In the action which resulted in the capture of Tikrit, the pilots and observers of No. 63 Squadron gave important help. They had not long been at Samarra before the advance began and there had not been much opportunity for liaison with other arms, nor for the pilots and observers to get to know the country. In the attack on Daur on the 2nd of November, the contact-patrol work of No. 63 Squadron had not been very successful and there had been misunderstandings with the artillery. The Indian divisions engaged at Daur had not previously co-operated with aircraft and sometimes failed to answer the air observer's signals. Information of several good targets sent down from the air had not been acted upon by the artillery. On the 5th of November, however, there was a marked improvement. The infantry engaged on this day still showed some reluctance in lighting flares to indicate their progress, but many more ground strips were displayed by the attacking formations,

and the air observers had little difficulty in reporting the progress of the attack. The main improvement, however, was in the aircraft co-operation with the artillery. From 6.15 a.m. on the 5th three aeroplanes were engaged on this work, and the response to their calls for fire was always instant and effective, with the result that the Turkish defences and active batteries were accurately ranged.¹

On the 17th of November Lieutenant-General Maude was taken ill with cholera and two days later he was dead. He had led his troops from victory to victory and his sudden death was a sad blow to the Army in Mesopotamia. He was succeeded by Lieutenant-General Sir W. R. Marshall, who had commanded the III Corps.

On the Tigris front the Turkish forces were out of striking range, and on the Euphrates, where they occupied Hit, they were also an appreciable distance from the British at Ramadi. On the eastern front, however, the enemy held Qara Tepe and the Jabal Hamrin passes on the right bank of the Diyala, near enough to the British positions for effective operations. Lieutenant-General Marshall decided to surprise and destroy the Jabal Hamrin force. His plan was to send an independent cavalry column up the Adhaim river to cut the communications north of Qara Tepe while the III Corps made a converging attack on the town. The two Flights of No. 30 Squadron were transferred from Baquba on the 2nd of December twenty miles up the Diyala to Qalat al Mufti for co-operation with the III Corps. 'C' Flight of No. 63 Squadron was, at the same time, moved from Samarra to Akab, at the junction of the Adhaim with the Tigris, for work with the cavalry. An advanced landing-ground for the Flight was found at a place called Chai Khana, thirty-five miles up the Adhaim.

The operations depended upon surprise for their full success, and bombing attacks were made on the Kifri aerodrome on the night of the 30th November/1st

¹ An entry in the General Head-quarters War Diary says: 'A feature of the operations has been the co-operation between our aeroplanes and artillery.'

December, but without inflicting serious damage on the German aeroplanes. On the 1st of December, and again next day, an enemy aeroplane succeeded in reconnoitring the British dispositions and particularly the cavalry concentration at Chai Khana. The result was that the Turks strengthened their hold on the passes over the Jabal Hamrin to oppose the cavalry advance and, on the evening of the 2nd, the general officer commanding the Cavalry Division informed General Head-quarters that it was very doubtful whether the cavalry would be able to break through in time to co-operate with the attack by the III Corps.

The III Corps attack began at dawn on the 3rd of December and apparently took the enemy on this section of the front by surprise. The opposition was feeble, but the advance was delayed by inundations and by the intricate nature of the country. Unfortunately the cavalry, as had been feared, were unable to break through to cut the Turkish communications and, during the night, the Turks succeeded in withdrawing from in front of the III Corps beyond Qara Tepe. The III Corps and the cavalry followed up the enemy, who retired through Kifri, where air observers reported that they had set fire to the coal mine and to the coal dumps. No. 30 Squadron and 'C' Flight of No. 63 Squadron, by close reconnaissance and contact patrol, co-operated with the III Corps and with the cavalry, and also made some bombing and machine-gun attacks on the Turkish troops.

The cavalry pursued the enemy, but it was not the intention of Lieutenant-General Marshall to fight the Turks in a series of rearguard positions north of Qara Tepe, and orders were given on the 5th of December for a withdrawal next day, by the III Corps, to a line Sakaltutan Pass-Qizil Ribat-Khanaqin. The cavalry division withdrew down the Adhaim to the bank of the Tigris. On the 7th of December 'C' Flight of No. 63 Squadron returned to Samarra, and next day the two Flights of No. 30 Squadron went back to Baquba.

While the Qara Tepe operations were in progress on the 5th of December, General Head-quarters received

reliable information that a convoy of 160 camels, carrying supplies, was moving across the desert from Humr on the Tigris to Haditha on the Euphrates. Their probable line of route, and the times they would be at various points in the desert, were worked out by the Intelligence staff, and the information was passed to No. 63 Squadron at Samarra with orders to attack the convoy. Two pilots (Captain R. D. Simpson and Lieutenant J. H. Caldwell) searched for the convoy in the morning, but found nothing. In the afternoon, however, they discovered the column and, from a height of 300 feet, dropped fifteen 20-lb. bombs and fired ten drums of machine-gun ammunition, with the result that many of the camels and some of the men were killed or wounded, and the convoy was scattered. This, although a minor incident, was of a kind calculated to impress the enemy. The convoy, trekking unseen across the desert, had its movements plotted in Baghdad, 180 miles away, and was then found and attacked through the long arm of the air service.

There was a lull in the military operations after the Qara Tepe attack. In the middle of December the weather broke and wind storms damaged the hangars on the aerodromes. Flying took place whenever there was an interval of fair weather and bombing attacks were made on the enemy aerodromes. From Kifri the German air detachment had moved back to Tuz Khurmatli, eighty-five miles north of Baquba. On the Tigris front the enemy aerodrome was at Humr. On the 17th, 27th, and 28th of December combined formations from Nos. 30 and 63 Squadrons attacked the Humr aerodrome. The enemy resisted these attacks vigorously, but his Halberstadt fighters were driven off. One British aeroplane was forced down and the pilot in another was wounded during the raids, which took toll of enemy hangars and also damaged aeroplanes on the landing-ground. At midnight on the 31st, when No. 63 Squadron at Samarra were celebrating the coming of the New Year, two German aeroplanes from Humr bombed the squadron camp and destroyed the contents of the cookhouse, but otherwise did no damage. In retaliation, twelve aeroplanes

from Nos. 63 and 30 Squadrons dropped a ton of bombs on the Humr aerodrome on the 3rd of January 1918. There were three combats while the raid was in progress, but none of them decisive. On the 21st of January the advanced German aerodrome at Kifri was attacked by twelve bombers, and many bombs were seen to burst near aeroplanes on the landing-ground. One of the bombers—a D.H.4 of No. 30 Squadron¹—received a direct hit by an anti-aircraft shell and was blown to pieces in the air. On the 24th two German aeroplanes retaliated with an attack on Baghdad which inflicted a few casualties in a rest camp and in a casualty clearing-station. A reply was quickly forthcoming. On the night of the 25th/26th five pilots from No. 63 Squadron bombed Humr aerodrome while five from No. 30 attacked Kifri. The pilots left at intervals of half an hour throughout the night and so spread the attacks over a period. During the raid on Kifri the engine in a D.H.4 of No. 30 Squadron (pilot, Captain F. Nuttall, observer, Lieutenant R. B. B. Sievier) caught fire at 1,000 feet. Although it was dark a safe landing was made, and after the two Lewis guns, with a supply of ammunition, had been taken from the burning aeroplane, the pilot and the observer set a course by the stars for the Diyala. They were cumbered by their load and hampered in their march by the difficulties of the ground, but they covered twenty-four miles during the night and reached the Diyala. The two officers slept in a ditch throughout the day, but when darkness came again they could not progress farther owing to inundations. On the second morning, however, they succeeded in signalling to British patrols on the opposite bank of the Diyala and they were brought in later by armoured cars.

Except for combats which resulted from the bombing attacks on the German aerodromes, there was only one encounter between British and enemy aircraft in January 1918. This was on the 31st, when a German two-seater which reconnoitred the Falluja aerodrome was pursued and shot down within the British lines by two Spad pilots

¹ No. 30 Squadron had only two D.H.4's, received in December 1917 and January 1918. Both were lost as stated above.

of No. 30 Squadron. The occupants, however, succeeded in burning their aeroplane and, eluding cavalry patrols sent out to intercept them, escaped to the Turkish lines. Four Royal Flying Corps aeroplanes, forced down through engine failure in enemy territory, were lost during the month. The naked body of one pilot of No. 63 Squadron was found by a desert patrol, with evidence that he had fallen into the hands of Arabs, and the occupants of the other three aeroplanes were made prisoners by the Turks.

At the beginning of January 1918 a small British column had pushed out as far as the Pa Yi Taq pass and, on its return, had occupied Qasr-i-Shirin, where a landing-ground and petrol dump were established. It was now possible for an aeroplane, by landing at Qasr-i-Shirin to replenish its fuel, to reach Kermanshah on the Persian plateau. On the 23rd of January two R.E.'s set out from Baquba for Kermanshah with dispatches for the British Consul. They made the journey successfully and returned next day with the consul's reply, which revealed that the inhabitants of the villages on the Persian plateau were starving. Partly for this reason, but chiefly because a British military mission was being organized for expedition to Armenia by way of Persia, Lieutenant-General Marshall decided to open the main trade route to Kermanshah. The garrison at Qasr-i-Shirin was increased and small posts were established along the Kermanshah road, on the repair of which native labour was employed.

The British military mission for Armenia owed its origin to the change in the military situation on the borders of Mesopotamia which had been brought about by the Russian revolution. On the 22nd of December 1917 the Russian revolutionaries had opened peace negotiations at Brest-Litovsk, but at that time an armistice between Turkey and Russia was already in force. December 1917, in fact, marked the end of Russian co-operation in Mesopotamia. The consequences were far-reaching. There were several thousands of German and Austrian prisoners of war in Russian Turkestan and Trans-Caspia who might, if Russia made formal peace, cross into Persia and re-enter the war. Furthermore, the political situation in Persia,

owing partly to Bolshevik propaganda, was extremely unsettled.

An armoured car detachment, under Major-General L. C. Dunsterville, with a number of officers for training purposes, was therefore assembled at Baghdad for an expedition to Armenia with the object of raising and organizing local forces of Georgians and Armenians to form a screen against Turkish or Bolshevik forces which might threaten the Mesopotamian right flank. Major-General Dunsterville, with the first part of his detachment, left Baghdad on the 27th of January 1918. In the later adventures of the 'Dunster force' aeroplanes played a notable part.

Meanwhile Lieutenant-Colonel C. B. Stokes, Lieutenant-General Marshall's chief intelligence officer in Baghdad, was appointed to the staff of H.M. Minister at Tehran. Lieutenant-Colonel Stokes had, for several years before the war, been the Military Attaché at Tehran and was therefore well acquainted with the country and its conditions. No. 30 Squadron was charged with the duty of conveying this officer. The distance from Baquba is 430 miles, and the flight called for the crossing of a mountain range rising to 12,000 feet. Much of the country was wild and uncharted. The journey was made at the end of January in an R.E.8 piloted by Lieutenant L. H. Browning, who landed on the way at Qasr-i-Shirin and Kermanshah. The 300-mile journey from the latter town to Tehran was made for part of the way in a snowstorm. When the R.E.8 landed at Tehran, Swedish gendarmerie attempted to intern the aeroplane although it had been stripped of machine-guns and other military armament. Russian Cossacks, however, frustrated the attempt and, some days later, Lieutenant Browning flew back to Kermanshah, where he picked up Colonel Bicharakoff, commander of a loyal Russian detachment, and flew with the colonel as passenger to Baquba.

At the beginning of March the Royal Flying Corps in Mesopotamia was reinforced by No. 72 Squadron, under Major H. W. von Poellnitz, which had arrived at Basra from England on the 2nd of March. The squadron was

sent, by detachments, for work on various parts of the front. 'A' Flight, equipped with D.H.4's, S.E.5's, and Spads, went to Samarra for attachment to the I Corps. 'B' Flight (Martinsydes) stayed at Baghdad to work under the orders of General Head-quarters, and 'C' Flight (Bristol monoplanes) was sent to Mirjana on the Diyala river for work with the III Corps.

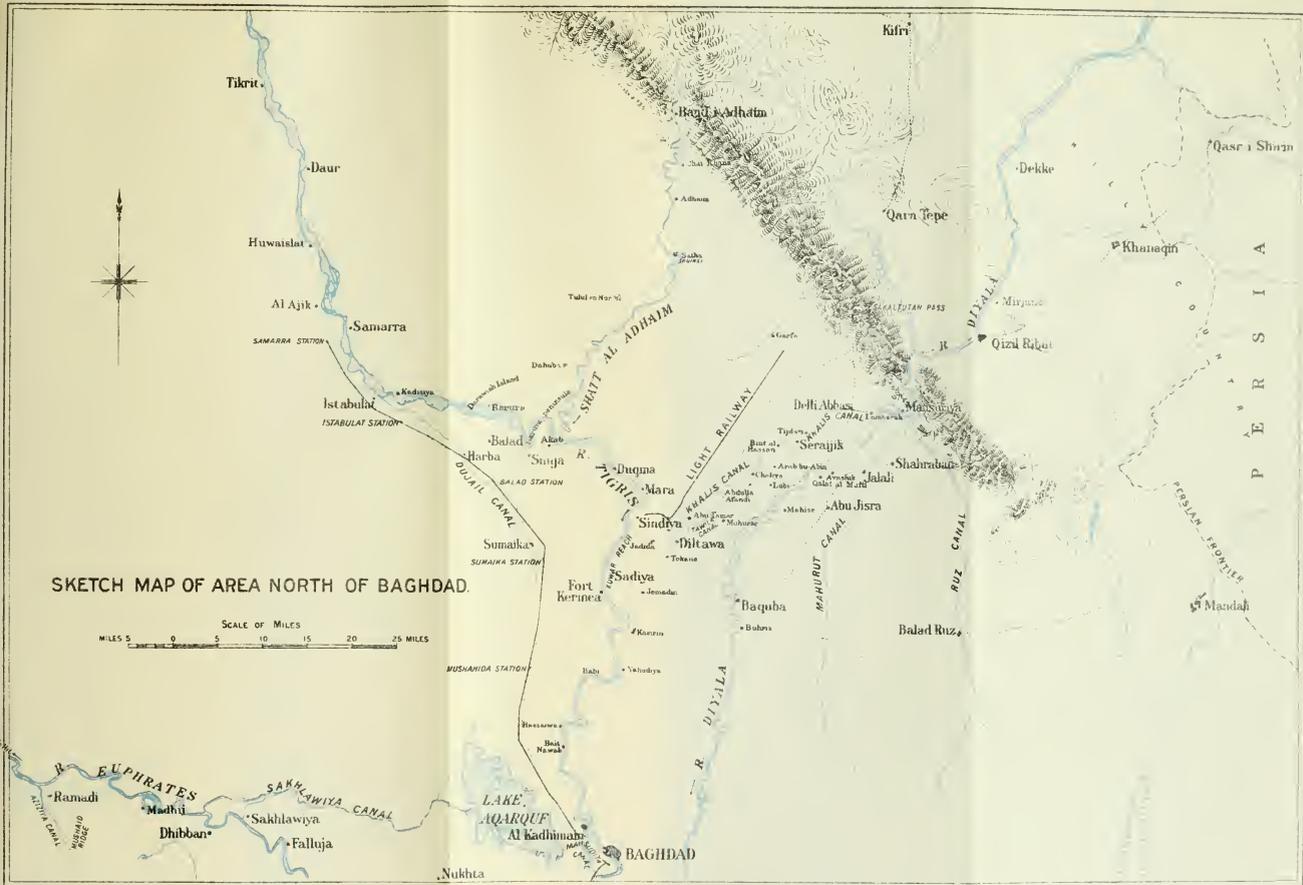
Victory on the Euphrates

[Map, p. 249]

It had been clear for some time that the Turkish forces at Hit, on the Euphrates, had been steadily reinforced. After the capture of Ramadi the Euphrates front had been quiet, and the resources of the district had been peacefully developed. But with the arrival of reinforcements at Hit, the Turks in January had become active, and Turkish patrols were pushed down the river as far as Qubba and Nafata. Lieutenant-General Marshall therefore decided to capture Hit and its garrison. The advance from Ramadi began on the 19th of February, when air reconnaissances by No. 30 Squadron brought back news that the Turks were evacuating their trenches south of Hit and were taking up a prepared position on high ground about two miles above the town at the Broad Wadi. There was also a strong enemy force at Sahiliya. The British intention was not to undertake serious fighting unless a decisive blow at the enemy could be made, and the advance against the strong positions indicated by the air observers was therefore halted until communications could be improved and ample supplies accumulated forward.

A concentration of aircraft for the further advance was also made. On the 22nd of February No. 52 Kite Balloon Section, which had been at Ramadi since the beginning of January 1918,¹ moved forward to Qubba. Next day

¹ No. 23 Kite Balloon Company (Sections 51 and 52) had arrived in Mesopotamia in September 1917. No. 51 Section went to Samarra. The balloon sections practised co-operation with the artillery, and the balloons, because of the fine landmark they provided, were particularly welcomed by armoured cars patrolling the desert.



SKETCH MAP OF AREA NORTH OF BAGHDAD

PREPARED IN THE HISTORICAL SECTION OF THE COMMITTEE OF IMPERIAL DEFENCE.
 800/29 1536/30 3100/25

'B' Flight of No. 30 Squadron moved to Ramadi from Falluja, and 'A' Flight of No. 30 Squadron and 'A' Flight of No. 63 Squadron flew to Ramadi from Samarra and Baquba. The composite unit, under the command of Major H. de Havilland, was instructed to undertake a vigorous bombing offensive against the Turks. The squadron got to work on the day of its arrival, when ten aeroplanes bombed and attacked with machine-gun fire Turkish camps in the Hit-Sahiliya area. Seventy-five 20-lb. bombs were dropped: horses were stampeded, transport disorganized, one aeroplane on the Hit aerodrome destroyed and others damaged, and several hits were made on camps. The bombing was continued on the 24th, when seven pilots attacked Hit and Sahiliya. The attacks on Hit were repeated through the night by four pilots. There was no bombing on the 25th, but on the night of the 25th/26th the camps at Hit were attacked by three pilots, while Hit aerodrome was bombed on the 26th by five aeroplanes, and again during the night of the 26th/27th by the same number. As a result of these attacks the German air detachment moved back from Hit to Haditha. The intensive bombing ceased on the 27th of February, when 'A' Flight of No. 63 Squadron returned to Samarra. This left 'A' and 'B' Flights of No. 30 Squadron at Ramadi, and these Flights continued to bomb the enemy, but were mainly occupied with reconnaissance and photography of the Turkish positions as far as Khan Baghdadi. On the 1st of March the head-quarters of No. 30 Squadron moved from Baquba to Ramadi, and on the 9th the squadron was transferred to a landing-ground at Qubba.

Meanwhile, on the 8th of March, an air observer came back with information that the Turks had evacuated their Broad Wadi entrenchments north of Hit and were moving back along the Sahiliya-Khan Baghdadi road. The advance began at once and Hit was occupied on the 9th and Sahiliya on the following day. The Turks, however, were not permitted to retreat unmolested. The country was unsuited to a rapid pursuit by armoured cars, nor were adequate cavalry forces available. The Royal

Flying Corps, therefore, was given the task of harassing the retreating Turks to the utmost. In the evening of the 8th of March five R.E.8's of No. 30 Squadron dropped thirty-three 20-lb. bombs on enemy columns north of Sahiliya and scored eleven direct hits. The pilots, when they had finished bombing, used all their machine-gun ammunition, from low heights, against the crowded troops and camels. From dawn to dusk on the 9th the bombing was continued and one hundred and forty-seven 20-lb. or 25-lb. bombs were dropped and over 7,000 rounds of ammunition fired. Transport was disorganized and a scattered trail of dead and wounded marked the passage of the aeroplanes. Next day—the 10th—forty-five bombs were dropped. By this time the air observers discovered that the main body of the Turks had reached Khan Baghdadi, where a position was taken up on rocky heights running into the desert on the right bank of the Euphrates.

Lieutenant-General Marshall, to make his hold on Hit secure, decided to push the enemy beyond the Khan Baghdadi position. The advance was carefully prepared, complete photographs of the Baghdadi positions were taken from the air, and from the photographs maps were compiled which were used during the operations. No. 52 Kite Balloon Section was brought forward on the 15th of March to Sahiliya.¹ At Hit a concentration of aeroplanes was made. In addition to the two Flights of No. 30 Squadron, which had moved from Qubba to Hit on the 11th, two Flights of No. 63 Squadron flew to Hit from Samarra. They reached Hit on the 25th of March, where their transport and personnel, sent in advance by way of Baghdad, had already arrived.

The advance on Hit had shown the difficulty of pinning the Turks to their ground. In an attempt to prevent the enemy slipping away again, once the advance on Khan Baghdadi began, a mobile unit of cavalry, armoured cars, and Ford vans, designated the 11th

¹ On the 26th of March the balloon was towed to a position seven miles beyond Sahiliya and some useful observation was made during the battle of Baghdadi.

Cavalry Brigade, had been formed and had reached Hit on the 23rd of March. The brigade was to make a wide turning movement against the enemy's right flank and get astride the Khan Baghdadi-Haditha road, in rear of the Baghdadi positions.

Major-General Brooking, in command of the operations, had one great anxiety. He had caught the Turks at Ramadi, but he realized that it would be difficult to do so again. His only chance of doing so depended on his receiving timely, accurate, and continuous reports of the situation from the Royal Flying Corps. It was essential, also, that the Cavalry Brigade under his command should be kept equally fully informed of the changing situation. One Flight of aeroplanes, therefore, was allotted to the Cavalry Brigade, one Flight to the Commander, Royal Artillery, and the remainder to head-quarters for general reconnaissance and contact-patrol work. Major-General Brooking established his head-quarters for the battle west of the Aleppo road about six miles north of Sahiliya, at a site chosen because it was near the only piece of ground in the area suitable for the landing of aeroplanes.

The date fixed for the advance was the 26th of March. The Cavalry Brigade moved during the night of the 25th/26th and soon after 5 p.m. on the 26th had got astride the road behind the Khan Baghdadi positions. The infantry assault on the first line of defence at Baghdadi had begun early on the 26th, some time before dawn. As soon as it was light, an aeroplane flew over the Turkish positions, and the observer delivered his reports by message bags which were received before 7 a.m. The reports revealed that there were no signs of a Turkish retirement and indicated the varying strength with which the enemy forward positions were held. Guided by the air reports Major-General Brooking issued his orders for the attack to begin. At 10.30 a.m. air reconnaissances gave the information that the Turks were withdrawing from their first to their second line of defences at Baghdadi. This second line was attacked, under cover of an effective barrage, at 5.30 p.m. By this time the way of retreat was already blocked by the Cavalry Brigade. The Turks

made a desperate attempt to pierce the cavalry screen at 11 p.m. but were firmly held by machine-gun fire, and next morning the enemy displayed white flags, and the whole force, numbering about 4,000, was captured together with ten guns, machine-guns, and war material of all kinds.

Khan Baghdadi was an outstanding success achieved by strategy similar to that which had won Ramadi. But the Baghdadi operations were more difficult, especially the part allotted to the 11th Cavalry Brigade. This brigade had to make a night and day march across a barren plateau, intersected by steep and rocky ravines, the topography of which was only approximately known. It would have been easy, as it would have been fatal to the success of the battle, for the Cavalry Brigade to lose direction, and it was due, in great measure, to the work of the contact aeroplanes, from dawn on the 26th, that the cavalry and armoured cars attained their objective. When the brigade was being assembled at Baghdad, two aeroplanes had been sent there to practise co-operation, and this careful preliminary work was largely responsible for the results achieved on the 26th of March. Throughout that day the contact-patrol air observers guided the Cavalry Brigade with precision. Messages were dropped from time to time giving the brigade its position, telling where water was to be found, and also giving information about the progress of the infantry battle at Baghdadi and about the enemy dispositions. Pilots landed alongside Cavalry Brigade Head-quarters, whenever possible, so that the observers might make their reports in person. The movements of the brigade were also reported throughout the day to Major-General Brooking.¹ On the main front the fire of the artillery was directed from the air, and tactical and strategical reconnaissances kept the command informed of the progress of the battle and of the Turkish

¹ 'The whole show depended on my getting rapid and accurate information. I, having caught the Turks at Ramadi, felt that I could only do it 'again provided I got good and quick information, and not only to myself, 'but to my Cavalry Brigade. This I got through the Royal Flying Corps.' (Major-General Sir H. T. Brooking in a personal letter to the author.)

movements. In addition, the enemy was vigorously bombed and attacked with machine-gun fire. Twenty-one such aeroplane attacks were made during the 26th on troops, transport, camps, and river craft in the Khan Baghdadi area. One hundred and sixty-five bombs, chiefly of 20-lb. weight, were dropped and many direct hits were made.

On the 27th of March the cavalry, armoured cars, and the mobile column in Ford vans, pushed on energetically along the Euphrates valley while the Royal Flying Corps made contact patrols and harassed the enemy troops with bomb and machine-gun. Haditha, with its ammunition and petrol dumps intact, was captured without serious resistance, and by the evening Khan Fuhaima was reached. The bombing on the 27th was made by eleven aeroplanes which dropped 3,014 lb. weight of bombs, mainly on troops and transport. The pursuit of the demoralized Turks was continued next day, when Ana was taken with its main ammunition, petrol, and stores dumps intact. During the seventy-three mile dash from Baghdadi along the Aleppo road, only made possible by the capture of the petrol dumps at Haditha and Ana, many additional prisoners were captured, bringing the total for the whole operation to 213 officers and 5,022 other ranks. Among the prisoners were Nazim Bey, the Turkish commander, and his staff.

Ana was the limit of the British pursuit, but a section of armoured cars undertook a further spectacular dash from Ana on a special mission. On the morning of the 25th of March, the day before the battle began, Lieutenant-Colonel J. E. Tennant, the Royal Flying Corps commander, had taken Major P. C. S. Hobart, Brigade-Major of the 8th Infantry Brigade, as a passenger in a D.H.4 to make a reconnaissance of the Baghdadi positions. During the flight the engine in the D.H.4 had been put out of action by machine-gun bullets fired from the ground, and the pilot had been forced to land. The D.H.4 was burnt and the two officers were made prisoners. They were taken to Nazim Bey, the Turkish commander, and, after interrogation, were sent on to Ana. They were, however,

allowed little rest and, mounted on camels, with an escort of twelve Tartars on foot, were sent north again across the open plain.

On the evening of the 27th, when the two officers were already some distance beyond Ana, Major-General Brooking sent a telegram to Brigadier-General R. A. Cassels, commanding the 11th Cavalry Brigade, saying: 'Get Tennant back.' When Brigadier-General Cassels reached Ana on the morning of the 28th he learned that the prisoners had left at 4 a.m. on the previous day. He thereupon instructed eight armoured cars, under the command of Captain D. Tod, to go along the Aleppo road for one hundred miles, if necessary and possible, and recover the two officers. The cars dashed forward and many retreating Turks along their way surrendered and were left on the roadside disarmed. At Nahiyeh Captain Tod was informed by an Armenian that the party he sought was a few hours ahead, and, proceeding with caution, he eventually came within sight of the Tartar escort and their prisoners at a point about thirty-two miles west of Ana. The leading car, moving from dead ground well in advance of the remainder, surprised and scattered the guard with machine-gun fire while the two officers made a dash from their camels for the cars which they eventually gained. Fighting their way the detachment got back to Ana and thence to Khan Baghdadi.¹

Before and during the battle of Khan Baghdadi the flying conditions had been excellent and the visibility perfect. One pilot likened the scene from the air to pictures of manœuvre battles of the eighteenth century. Every position stood out in the clear light sharply defined, and from the aeroplane the whole battle area could be surveyed. But during the night of the 31st of March/1st of April, when the remnants of the defeated Turkish army were being brought in, a sudden gale struck the camps on the Euphrates and within a short time hangars and

¹ On the day Lieutenant-Colonel Tennant was captured the command of the Wing was taken over by Major R. A. Bradley, who continued in the command until the end of the war. Lieutenant-Colonel Tennant left Mesopotamia for England on the 17th of April 1918.

tents had been blown down and the camps flooded. The kite balloons were whirled away and lost, three aeroplanes were wrecked, and seven others were damaged. Had the storm come a few days earlier, the Khan Baghdadi operations must have been very seriously affected.

CHAPTER VI

AIR OPERATIONS IN MACEDONIA

1916—March 1918¹

[Maps, pp. 341 and 366]

FOR nearly five hundred years Macedonia was ruled by Turkey. Its foremost seaport, Salonika, has always been of strategic importance because it forms the outlet for the ancient highway which branches off at Niš from the still greater highway to Constantinople. The Niš-Salonika route follows the valley of the Vardar through a rich agricultural country, and Salonika is well placed to become one of the greatest ports of the Near East. The Turkish dominion extended into the Balkans far beyond Macedonia, but Greece threw off Turkish rule in 1829 and Serbia won her freedom in 1867. Unsuccessful revolts by the Bulgars, a Slavonic people, were marked by atrocities, committed by Turkish irregulars, which roused world-wide indignation and resulted in the intervention of Russia. With the help of Romania, and, later, of Serbia, Russia defeated Turkey and, by the Treaty of San Stefano of March 1878, Bulgaria was constituted an autonomous state to include most of Macedonia.

The treaty, however, was not allowed to stand. It had been made clear to Russia by other interested Powers that any settlement reached as a result of the war must be approved by them, and in due course the treaty was discussed and revised at the Congress of Berlin, where Britain, in particular, raised objections about the extent of the territory allotted to the new Bulgaria. The British views ultimately prevailed and, by the Treaty of Berlin, Bulgaria lost about two-thirds of what had been promised her, and Turkey was allowed to retain dominion over Macedonia.

There was comparative quiet, the quiet of effective oppression, until 1906, the year of the Turkish Revolution which was acclaimed in Macedonia and throughout the

¹ The student is referred also to *Military Operations, Macedonia*, by Captain Cyril Falls.

Balkans generally. The new Turks, however, proved even less docile than the old. The chief races making up the population of Macedonia were Serbians, Bulgarians, and Greeks, all of Christian religion, and when the new rulers began to abolish racial distinctions in pursuit of an intense nationalist policy there was a rising tide of anger in the neighbouring countries at the treatment meted out to those of their race and faith within the Turkish borders. This anger culminated in the First Balkan War which opened in October 1912, and brought overwhelming victory to the three Christian allies. Turkey was expelled from Macedonia, but the victors were soon in disagreement about the division of the gains, and their quarrel led to the Second Balkan War in July 1913, when Bulgaria came into conflict with Serbia and Greece. Rumania joined in the alliance against Bulgaria, and Turkey took the opportunity to recapture some of the ground she had lost. Bulgaria, assailed from all sides, was overwhelmed in a few days and the war was concluded by the Treaty of Bucharest, signed on the 9th of August 1913.

By this treaty the frontiers of Serbia were extended to include northern Macedonia to a line south of Monastir, Greece acquired all southern Macedonia as far as the port of Kavalla and including the town of Salonika, and Rumania received from Bulgaria a strip of the Southern Dobruja on the shore of the Black Sea. Bulgaria herself, largely as a result of Austrian backing, was allowed to annex the valleys of the Upper Struma and Mesta, and was given an outlet to the Aegean between Kavalla and Dede Agach.

Such was the position on the outbreak of the European War in 1914. Greece had reason to be satisfied with what she had acquired, but Serbia and Bulgaria harboured disappointment, the former because she had been denied, by Austria, a port in the Adriatic, and the latter because her dream of a greater Bulgaria had been shattered. When Austria-Hungary declared war on Serbia on the 28th of July 1914, Italy, Bulgaria, Greece, Rumania, and Turkey, decided to remain neutral while Montenegro joined with Serbia. It will be unnecessary to follow the

fluctuations of the early fighting on the Serbian front. By December 1914 Serbia, as a result of the classic battle of the Kolubara, had defeated the Austrians and had won a respite during which she could reorganize her armies, gravely exhausted after months of bitter campaigning.

Throughout the greater part of 1915 the Serbian army continued on the defensive. Meanwhile Turkey in November 1914, and Italy in May 1915, had entered the war, but although Serbia was pressed, from various quarters, to resume the offensive, particularly after the declaration of war on Austria by Italy, she held her hand. Chiefly she was anxious about the attitude of Bulgaria who was wooed, with territorial promises, both by the Allies and by the Central Powers.

Although the sympathies of Bulgaria remained with the Central Powers, it was obvious that she would not allow those sympathies to dictate her policy, but would watch, with an appraising eye, the progress of military events. Before the summer of 1915 had ended it was clear what her decision would be. An Austro-German offensive against Russia, which had begun on the 2nd of May, pushed the Russians back headlong, and in so doing struck a blow from which the Russian armies never fully recovered. Danger from Russia had been removed for as long as needed to be foreseen, and the German and Austrian armies were left free to devote their offensive energies to a campaign elsewhere. Nor had the British operations against Turkey on the Gallipoli Peninsula produced any prospect of an Allied victory to divert the mind of Bulgaria from the glamour of German military might.

Germany decided that the time had come for a campaign to crush Serbia. Turkey sorely needed munitions, and if Serbia could be overrun, with the co-operation of Bulgaria, it would be possible to send munitions through to Turkey by way of the Danube and the railway through Sofia. Germany did not doubt that Bulgaria would no longer hesitate when she knew that she was assured of German help and leadership. Nor was Germany wrong. An emissary of Bulgaria left Sofia for Berlin early in August and, on the 6th of September 1915, a convention was

signed which defined the parts which Germany, Austria, and Bulgaria would take in the attack on Serbia.

The Austro-German offensive, which began on the 6th of October, a week before Bulgaria openly declared war, was directed by Field-Marshal von Mackensen, but although the Germans and Austrians advanced steadily, there is little doubt that the Serbian armies could have been withdrawn more or less intact had not the Bulgarians cut off the routes to the south. The Serbians were left only one way of escape, to the Adriatic across the snow-covered tracks of the Albanian mountains, and their passage to safety was marked by an army of frozen dead. The remnants were eventually reorganized, mainly on the Greek island of Corfu, and by May 1916 the Serbian army had come into action again, 125,000 strong, on the Salonika front.¹

Meanwhile, on the 5th of October 1915, French and British troops had begun to land at Salonika at the request of M. Venizelos, the Greek premier. Greece and Serbia had been bound, by a military convention, to help each other in the event of an attack by Bulgaria, but Greece had decided that, in the circumstances, she could fulfil her obligation only if the British and French Governments supplied 150,000 men, which was the number of troops that Serbia had promised, under the convention, to concentrate against Bulgaria: it was obvious at the time that Serbia would be unable to do this because she would require every resource to meet the Austro-German threat. Although, however, the Allied troops were landed at Salonika at the invitation of Greece, on the day they went ashore M. Venizelos, finding that the King and the Greek general staff definitely opposed his policy, resigned, and it at once became clear that Greece would, at best, be neutral, and, at worst, might take steps aimed at the ejection of the Allied troops.

On the 14th of October 1915 Britain declared war on Bulgaria, but by that time the British general staff held the view that it was too late to do anything to save Serbia.

¹ The strength of the Serbian army before the retreat began was stated to be 420,000.

The French, however, thought otherwise, and ultimately it was agreed that the Allies should take action on the understanding that if communication with the Serbian army could not be opened and maintained the Allied forces would be withdrawn. The French, and later the British, moved up-country from Salonika, but the Allied forces proved too weak to open communications, and they withdrew to Salonika to a series of entrenched positions which had been completed by the end of December 1915.

There ensued a period of stalemate, enlivened from time to time by rumours of a German and Bulgarian offensive, and by the unpredictable attitudes of the Greeks.

The arrival of a Zeppelin airship on the Macedonian front early in 1916 had caused some excitement. The first ship, the *LZ.81*, which operated from Timisoara, in southern Hungary with orders to destroy the harbour facilities at Salonika, was dogged by engine troubles and was eventually replaced by the *LZ.85* (Oberleutnant Ernst Scherzer). This ship made her first attack on Salonika during the night of the 31st of January/1st of February 1916, when the premises of the *Banque de Salonique* were hit by an incendiary bomb and gutted with a loss of stored goods valued at three million francs. Another bomb fell alongside a British transport from which ammunition was being unloaded and killed a few Allied soldiers and Greek labourers: fortunately the ammunition escaped a hit. The *LZ.85* successfully attacked Salonika again on the night of the 17th of March, but her third attempt, made on the 5th of May, ended in disaster. When she appeared over the harbour about 2.15 a.m. she was caught in the beams of a searchlight from the battleship *Agamemnon* which opened fire and quickly scored a hit. The airship began to descend slowly towards the mouth of the Vardar, and as she came down she was struck by three shells from the British torpedo-boat *T.B.18*. She fell in the marshland near the Vardar mouth and her crew, who wandered about in an attempt to escape, were eventually surrounded and captured by parties of French soldiers. The airship attacks on Salonika had alarmed the polyglot peoples inhabiting the port, and the destruction of the

LZ.85, which ended this form of attack, was more than an episode. The Allies depended much on local labour and on the trading activities of the town and could ill afford to see that labour, and the life of the town generally, disorganized because of the fear of air attack.

In April and May the re-equipped Serbian army landed at Salonika from Corfu. The arrival of the Serbs led the Bulgars to believe that an Allied offensive was imminent, and, to forestall the Allies, the Bulgars advanced into Greek territory and occupied Fort Rupel and one or two other works which commanded the line by which the Allies might be expected to move. The Greek Government, arguing that they could not treat one belligerent differently from another, did not object to this occupation of their forts, but the Greek people were less tractable and there were many public protests. The Allies instituted a 'pacific' blockade of Greece and presented demands, ultimately accepted, that the Greek armies should be demobilized and reduced to a peace footing.¹ Meanwhile the Allies had begun to move forward, but there were grave differences of view between the French and British Governments, and between their general staffs, about how far action should go. The French wished to undertake a full offensive against Bulgaria, but the British attitude was strictly defensive.

On the 9th of May 1916 Lieutenant-General G. F. Milne, the commander of the XVI Corps, succeeded Lieutenant-General Sir Bryan T. Mahon in the command of the British forces, which had been placed in January under the general direction, with certain qualifications, of the French General Sarrail who had been appointed Allied Commander-in-Chief. Up to the time when Lieutenant-General Milne took command, such air reconnaissances as the British staff required were partly made by seaplanes from the aircraft carrier *Ark Royal*,²

¹ The aircraft carrier *Empress* was with the Allied fleet in Milo Bay during the period of uncertainty. See p. 374.

² The *Ark Royal* had returned to Mudros in the middle of March 1916, but five of her seaplanes had been left behind at Stavros to make a photographic reconnaissance in that area. See pp. 371-2.

and partly by British observers in French aeroplanes. With the arrival, however, of the Serbians at Salonika, the French aeroplanes were withdrawn from the British for attachment to the Serbs, and Lieutenant-General Milne thereupon asked to be supplied with two Royal Flying Corps squadrons. Meanwhile, at the end of May, naval aeroplanes were sent to Thasos, where they were joined by French aeroplanes for attacks on the lines of communication on the flank of the Bulgarian army.¹

The War Office decided that whatever aeroplanes were provided for Salonika must come, in the first place, from Egypt, and must form part of the Middle East Brigade which was in the process of formation under Brigadier-General W. G. H. Salmond. Accordingly, Lieutenant-Colonel P. R. C. Groves was sent to Salonika from Egypt to confer with the army staff, to survey the country, and to make arrangements for the reception of a Royal Flying Corps squadron and an Aircraft Park. Lieutenant-Colonel Groves arrived on the 1st of July. In his subsequent report he stated that the French had a considerable air service in the area, totalling some 160 aeroplanes. The enemy aerodromes, already located, were at Monastir, Hudova, and Xanthe, and the enemy air strength, as calculated by the French, was about fifty aeroplanes, but the service was reported to be increasing. He made detailed recommendations and set out the arrangements he had already started for the reception and distribution of the squadron and of the Park.

While he was still in Macedonia, in July, an advanced detachment of No. 17 Squadron arrived from Egypt and took up quarters at Mikra Bay about four miles south-east of Salonika. By the end of the month the squadron, under Major E. N. Fuller,² was completely installed and was mainly equipped with B.E.2c and B.E.12 aeroplanes.

About this time the situation in Macedonia underwent a change as a result of the entry of Rumania into the war. The sympathies of Rumania had been with the Allies

¹ See pp. 375-6.

² The command of No. 17 Squadron was taken over by Major J. H. Herring on the 4th of February 1917.

from the beginning, and by the spring of 1916 it was clear that she would be ready to join in the war at the first favourable moment. That moment had come in June, when Russia opened the 'Brusilov offensive' which met with success and led Romania to believe that an opportunity had arrived such as might never recur. The Russians, who had reached the foot of the Carpathians by the middle of July, would be able, so it appeared to the Romanian general staff, to cross the Carpathians side by side with the Romanian armies and overrun Hungary. The Romanian Prime Minister informed the French Minister at Bucharest that Romania was ready to join the Allies on conditions, one of which was that she should be protected against Bulgaria by Russian troops, or by an Allied offensive from Salonika. After debate and delay the Allies agreed to make an offensive in Macedonia to facilitate the Romanian mobilization and concentration. Romania declared war on Austria-Hungary on the 27th of August 1916, and Germany, Turkey, and Bulgaria thereupon declared war on Romania.

In accordance with General Sarrail's plan for offensive operations, arising out of the agreement with Romania, the British forces, as a preliminary, took up new dispositions and, by the 3rd of August, when these initial movements had been completed, the British XVI Corps (27th and 28th Divisions) was defending the lower Struma to Lake Tahinos, and a front from Tahinos to a point near Lake Butkovo. Left of this corps were French troops as far as Kilinder, south of Lake Dojran, where British troops, namely, the XII Corps (22nd and 26th Divisions), again took up a front stretching as far as Chaushitsa, north of Lake Arjan. Left of the British again came the French and Serbs. The main line of communications of the XVI Corps on the Struma front, so-called, was the Salonika-Seres road. The XII Corps, on the Dojran front, had direct rail as well as road communications. From the 17th of August onwards the Bulgarians, as a preparatory step in anticipation of the entry of Romania into the war, and of the activity which must be expected to follow, made an appreciable advance on both flanks

of the Allies in eastern and western Greek Macedonia. In the eastern area the Greek Army Corps which extended between Demir Hisar and Kavalla withdrew, and the Greek garrison at Kavalla surrendered. By the end of August Macedonia, east of the Struma, was in enemy occupation.¹

Throughout the month of August the main work of No. 17 Squadron at Mikra Bay was reconnaissance. On the 3rd of September 'B' Flight of the squadron moved to Avret Hisar to work directly for the XII Corps on the Dojran front, while towards the end of the month 'A' Flight went to Lahana for work with the XVI Corps. From the beginning the superiority of performance of some of the German aeroplanes was marked, and was, indeed, to be noticeable until well into 1918. What was also apparent was the efficiency of the enemy anti-aircraft gun-fire, particularly in the neighbourhood of Lake Dojran, and the reconnoitring aeroplanes of No. 17 Squadron were often hit, though not seriously, at heights up to 12,500 feet.

The Allied operations in Macedonia, to help Romania, had begun towards the end of August, but Romania herself was quickly and effectively dealt with by the German command. The Romanians had opened their campaign on the 28th of August, but, confronted by the two most capable German commanders of the war, Generals von Falkenhayn and von Mackensen, the Romanian armies were overwhelmed, and by the end of 1916 the greater part of their country had been overrun. The hopes which had been centred on her entry into the war faded, therefore, as the campaign progressed until, with the overrunning of Romania, the hopes were extinguished, thereby affecting the Allied operations in Macedonia.

The main operations on the Macedonian front took place in the area of Monastir, the principal town of Macedonia after Salonika. The Allied pressure was such that, in spite of German reinforcements, Monastir was abandoned to the Allies during the night of the 18th of

¹ For an account of the air operations on the Eastern Macedonian flank by naval aircraft, see p. 376.

November 1916. Early in December, however, General Sarrail decided that as he could do nothing more to help Romania, he would cease his attacks and reorganize his forces. As a result of adjustments and changes of disposition, the British, by the end of the year, held the whole area from the Aegean, at the Struma mouth, by way of lakes Tahinos, Butkovo, and Dojran, to the Vardar at Machukovo. On this line they were to stand throughout most of the remainder of the war.

Meanwhile the Royal Flying Corps had settled down. On the 20th of September the personnel of a wing headquarters, together with No. 47 Squadron and No. 17 Balloon Section, had disembarked at Salonika. On the same day the Sixteenth Wing was formed under the command of Lieutenant-Colonel G. W. P. Dawes. No. 47 Squadron, under Major C. C. Wigram,¹ went to Mikra Bay, where an Aircraft Park had been started by Major A. Cleghorn.

In due course the Royal Flying Corps units were redistributed. No. 17 Balloon Section moved to Kopriva on the Struma front towards the end of October. The Flight of No. 17 Squadron which had been working for the XII Corps on the Dojran front returned to Salonika on the 20th of October and its place was taken by No. 47 Squadron, which moved to Yanesh towards the end of the month. 'C' Flight of the squadron was detached at an aerodrome at Kukush, previously occupied by the French. This Flight moved to Snevche at the beginning of December: it exchanged aerodromes again on the 20th of January 1917 with 'B' Flight at Yanesh. Both on the Struma and the Dojran fronts the squadrons were engaged on reconnaissance and photography, and in the work of co-operation with the artillery. In November the B.E.12 (140 horse-power Royal Aircraft Factory engine), a single-seater of better performance than any other aeroplane in possession of the squadrons, came into use.

On the 10th of December 1916 Lieutenant W. S. Scott

¹ Major F. F. Minchin took command of No. 47 Squadron on the 1st of January 1917. The history of the squadron in the war is told in *Over the Balkans and South Russia*, by H. A. Jones.

of No. 17 Squadron, carrying a Greek officer as his observer, reconnoitred the area of Drama to find a suitable piece of ground on which he might later land with an agent. During the homeward journey a German aeroplane from Drama aerodrome attacked the British aeroplane, but was shot down out of control by Lieutenant Scott and seen to crash by the Greek officer. A week later the pilot set out with his agent and landed successfully in the Drama valley in a mist: the passenger disappeared into the fog and the pilot flew away again. The same pilot landed a second agent in the Drama area on the 1st of January 1917. Four days later, seven aeroplanes of No. 47 Squadron attacked dumps and camps at Hudova station, but one pilot who was forced to land was captured, uninjured, after destroying his aeroplane.

There were a number of combats, particularly with reconnoitring German two-seaters. On the Struma front Captain G. W. Murlis-Green, of No. 17 Squadron, flying a B.E.12, quickly achieved success. On the 13th of December he had sent an enemy two-seater crashing into a gully near Fort Rupel. On the 4th of January he shot down an aeroplane in the British lines with its observer wounded, and ten days later, in company with Lieutenant F. G. Saunders, he helped to shoot down yet another which fell near the squadron's aerodrome at Lahana. No. 47 Squadron had similar successes; two-seaters were shot down on the 23rd of December by Captain W. D. M. Bell, and on the 19th of January 1917 by Second Lieutenant C. ff. Denning, the victim of the latter landing intact within the British lines. This squadron had, on the 15th, lost an aeroplane which was acting as an escort to a reconnaissance aeroplane, and a note dropped by a German pilot, with two bombs, on the aerodrome at Snevche stated that the two occupants had been killed in combat.

About this time a German fighter pilot, who was to prove an elusive adversary, began to have success on the front. He was Leutnant von Eschwege, stationed at the Drama aerodrome. On the 18th of February Captain Murlis-Green and Lieutenant J. C. F. Owen, of No. 17

Squadron, flying B.E.12's, set out for Drama to challenge Eschwege, and as they arrived over the aerodrome they found him climbing to meet them. Both B.E. pilots dived, but Captain Murlis-Green's gun jammed soon after he had opened fire, and while the stoppage was being rectified, Lieutenant Owen, who continued to fight Eschwege, was shot down by what appeared to be machine-gun fire from the ground: Owen landed close to the Drama aerodrome, and before his opponent landed near, he had set fire to his aeroplane which was destroyed. It was said that he was subsequently court-martialled by the Bulgars for burning his aeroplane and that Eschwege defended him with great stubbornness.¹

The German Bombing Squadron

There was alarm on the Dojran front on the 26th of February. In the morning a V-shape formation of twenty large-type aeroplanes was seen to be flying down the Vardar, and almost before ground observers had had time to realize that they were hostile, bombs were falling on the French aerodrome at Gorgop on the right bank of the river. Eight French aeroplanes were destroyed and four were damaged. In the afternoon the raiders were signalled again and they flew towards the railhead at Yanesh near which was situated the head-quarters of the XII Corps and the main aerodrome of No. 47 Squadron. No warning of their approach was received at the aerodrome, but the morning attack on the French at Gorgop had suggested that Yanesh, the chief Royal Flying Corps station in the same area, might next be visited, and pilots were ready to take the air rapidly. As soon as the German formation was seen, pilots ran to their aeroplanes and were in the air, climbing as best they could, while the enemy were still moving towards Yanesh. The bombs, which were aimed by the Germans at dumps and camps near the railhead, including XII Corps head-quarters, but mainly at the

¹ It would seem that Eschwege shot Lieutenant Owen down. See *War Flying in Macedonia*, by Haupt Heydemarck, pp. 21-3. This book gives an interesting account, from the German side, of some of the air operations, mainly in Eastern Macedonia.

aerodrome, inflicted little damage. There were, however, 28 casualties, of which 16 occurred on the Yanesh aerodrome (7 mechanics killed and 1 officer and 8 mechanics wounded).

Early next day, the 27th, the bombers appeared again, but they passed on their way, scattering people on the ground to cover as they went, to Salonika, where the main attack was made on Summerhill camp, north of the town. The British military casualties were heavy: 115 were killed and 261 wounded. As the raiders approached the city, the available aeroplanes of No. 17 Squadron, seven in number, ascended, and their subsequent attacks helped to break up the German formation; an escorting Halberstadt fighter was forced to land, its pilot being taken prisoner by the French. On the return journey, when the bombers passed near the aerodromes of No. 47 Squadron, there were many engagements with the waiting pilots of the squadron. The advantage, however, was with the enemy, and in the many combats which took place the aeroplanes of No. 47 Squadron, which were of poor performance, were much shot about, although there were no casualties.

Such was the opening of the German bombing campaign on the Macedonian front which the Royal Flying Corps was ill equipped to meet. The length of the British front was about ninety miles and, except on the right wing where naval aircraft operated, there were no more than two squadrons to do all the work of reconnaissance, photography, &c., required. There was no differentiation between corps and army work. Whatever tasks were set, and no matter how far behind the enemy lines, the pilots of these two squadrons had to do them. Because of the losses sustained by the French air service at Gorgop on the first day of the German bombing squadron's activities, the French could not undertake the patrol of their lines between the Vardar and Isvor and they called upon the Royal Flying Corps to help. No. 47 Squadron was instructed to extend its patrol area towards Gorgop, but the squadron already had more than enough to do and could give the French little effective aid.

The German squadron—No. 1 *Kampfgeschwader*—had

come from Bucharest after a bombing campaign against Romania. It achieved a great measure of mobility because it had a railway train attached in which the offices, stores, &c., were housed. There was no warning of the arrival of the squadron at Hudova aerodrome, and the first that was known of its presence was when the bombing formation approached Gorgop aerodrome on the 26th of February. It was equipped with A.E.G's (*Allgemeine Elektrizitäts Gesellschaft*) fitted with two 260 horse-power Mercédès engines, Rumplers with two 150 horse-power Benz engines, and Friedrichshafeners with two 260 horse-power Mercédès. There were also one Gotha bomber (two 260 h.p. Mercédès) and some single-seater Halberstadt fighters.

It happened that at the end of February, when the bombing squadron appeared, Lieutenant-General Milne had directed that plans should be prepared for an attack by the XII Corps on the western shore of Lake Dojran as part of a general Allied offensive. It was clear that unless air reinforcements were received, aircraft co-operation in the proposed attack would certainly be inadequate and might be impossible. On the 4th of March eighteen aeroplanes, made up from both Nos. 47 and 17 Squadrons, attacked the aerodrome at Hudova. The bombing aeroplanes were those normally employed on the work of co-operation with the artillery and consisted of Armstrong-Whitworths and of B.E.2c's with 90 horse-power engines. They would not carry observers and bombs, so they were flown as single-seaters and protection was provided by six single-seater B.E.12's. Forty-five bombs were dropped on or near the aerodrome, but apparently no important damage was caused. In the afternoon of the same day nine of the British two-seaters, with five single-seaters as escorts, attacked the enemy dump at Cestovo, doing much damage.

At 8.30 a.m. on the 4th the German pilots again visited Salonika, where they dropped bombs on dumps and camps at Dudular. Little damage resulted, but there were 64 casualties, most of them occurring at No. 29 General Hospital. On the 12th the German bombing squadron

turned its attention to Vertekop, outside the British area, on the Salonika-Monastir railway, and, once again, a field hospital suffered most: among the victims were two British nurses who were killed.

After the German bombing squadron had returned to its aerodrome at Hudova, thirteen Royal Flying Corps aeroplanes, with an escort of seven, dropped sixty-one bombs, mostly of 16-lb. weight, on and about the aerodrome. Many enemy fighters took the air on the approach of the British aeroplanes and there was some fierce fighting from which Second Lieutenant D. H. Glasson did not return. In the afternoon there came retaliation against Yanesh aerodrome, but the bombs just missed the target. A note dropped at the same time gave the news that Second Lieutenant Glasson had been shot in the stomach and had died just before the German squadron set out for Yanesh.

The activities of the German bombing squadron had stirred the whole front and had made the position of the Royal Flying Corps, with its inferior equipment, a difficult one. Not only could the German bombers brush aside without much difficulty most of the opposition with which they had to contend, but they were, in addition, almost untroubled by anti-aircraft gun-fire. On the whole British front there were no more than sixteen anti-aircraft guns.

Lieutenant-General Milne therefore wrote to Vice-Admiral Sir Cecil F. Thursby, commanding the Eastern Mediterranean Squadron, asking if naval aircraft could be placed at his disposal. The vice-admiral, in reply, sent four Sopwith two-seater fighters ($1\frac{1}{2}$ strutters) and one Sopwith Triplane at the end of March. Meanwhile the organization of a composite fighting unit to include these naval aeroplanes had been begun. Three B.E.12's were taken from No. 17 Squadron and one from No. 47 Squadron, which also supplied two D.H.2 Scouts. Although these aeroplanes were inferior in performance to the Halberstadt fighters which escorted the bombers, and had no advantages in combat over the bombers themselves, the composite squadron was immediately successful. On the

18th of March the German bombing formation twice crossed the lines to make a raid, but the British fighter pilots ascended in time to attack the bombers on their inward journey and fought with such determination that the German formation was broken, and the enemy pilots eventually went back the way they had come without attacking any objective. Nor did they go back without loss. Captain G. W. Murlis-Green, in a B.E.12, attacked from below at 30 yards the rearmost of six bombers. Two drums from his Lewis gun sufficed to cripple the bomber which crashed in 'no-man's land' and was subsequently shelled. Shortly afterwards, the same pilot found another formation of five and, attacking in the same way, nearly repeated his earlier success. After three drums of ammunition had been fired into one of the bombers, petrol streamed from it and one member of the crew fell across the side of the cockpit over which he was still hanging as the bombing aeroplane dropped down. The same officer next morning attacked over Lake Dojran a two-seater reconnaissance Albatros which crashed and caught fire. Another pilot of No. 17 Squadron, Lieutenant F. G. Saunders, also attacked the German bombing formation. Using tactics similar to those employed by Captain Murlis-Green, he fired into a bombing aeroplane which dived steeply, but he was himself forced to land through damage to his aeroplane inflicted by two escorting Halberstadts. On the 20th this officer, flying on the Struma front, shot down an Albatros two-seater which crashed in a ravine.

In the evening of the 28th of March the German bombers, in a formation of ten, approached the aerodrome of No. 47 Squadron at Snevche. By this time the naval fighters had arrived on the front and, in company with Captain Murlis-Green, they attacked and drove back the raiders, who were given no opportunity to drop their bombs and were pursued as far as their aerodrome at Hudova.

On the night of the 2nd of April, and again on the following night, Hudova was attacked with 20-lb. Hales bombs and with incendiary bombs. On the 5th the German bombers came out again, but they chose an objective near the front line, namely, the dumps and the railhead at Karasuli:

an ammunition train standing in the station with a load of over 4,000 shells was hit and totally destroyed, and few shells were left in the nearby ammunition dump which blew up. The bombing took place at 3.15 p.m., and it was not until 10.15 next morning that it was safe to approach the railhead, where the few buildings had mostly been destroyed. The fighters from the composite squadron had got quickly into the air when the raiders were signalled, but the British pilots had no opportunity to attack the German formation before the bombs had been dropped. The bombers were attacked on their homeward journey, but the combats were indecisive: a British pilot was wounded. On the 8th of April the bombers attacked Yanesh railhead and its vicinity, but inflicted little damage. Captain F. G. Saunders was wounded while attacking the formation, but two other pilots forced one of the German aeroplanes, a Friedrichshafener, which had been damaged by anti-aircraft gun-fire, to land near the aerodrome at Snevche: the crew of three, two officers and one mechanic, were taken prisoners. On the 22nd the squadron from Hudova bombed advanced bivouacs in the XII Corps area and, once again, there were many combats, during which a naval air observer was wounded.

The Royal Flying Corps flew their two-seaters without observers and made retaliatory raids as opportunity offered, usually with an escort provided by the composite squadron. No. 17 Squadron thus attacked dumps at Cestovo on the 23rd of April and at Cerniste two days later, when an ammunition dump was blown up. In the afternoon of this same day, the 25th, eight bombers of No. 17 Squadron, with an escort of six fighters, set out to bomb dumps at Bogdanci, but when the British formation arrived over the lines, the German bombers appeared on their way to make a raid. There was an immediate clash, during which one British aeroplane (Lieutenant G. A. Radcliffe) went down in flames, and one Friedrichshafener crashed and was destroyed by fire. When the German aeroplanes had been dispersed, the British formation continued on its way and bombed its objective. On the 28th the enemy

squadron attacked Royal Flying Corps aerodromes and other targets, but without inflicting damage.

Meanwhile, as a further result of Lieutenant-General Milne's request for help from the Royal Naval Air Service in the Mediterranean, Vice-Admiral Sir C. F. Thursby had given instructions for the organization of a special bombing squadron for service in Macedonia. This squadron, called 'F' Squadron, arrived on a previously selected aerodrome at Amberkoj on the 29th of April.

It was equipped with Sopwith $1\frac{1}{2}$ strutters, was commanded by Squadron Commander J. R. W. Smyth-Pigott, and was to be employed for a counter-bombing offensive under the orders of the Sixteenth Wing head-quarters. With the arrival of 'F' Squadron the tables were turned. Bombing attacks were made on most days, and sometimes twice daily, on the dumps and camps behind the Dojran front. During an attack on the aerodrome at Hudova on the 10th of May it was seen that the sheds and hangars which had been erected subsequent to the arrival of the German bombing squadron, together with the special train in the aerodrome siding, had disappeared, and it was concluded that the enemy bombers had left for some other front. They were afterwards identified in Belgium.

On the 11th of May 'F' Squadron left Amberkoj to undertake an offensive from Marian aerodrome on the Struma front. Raids were made against the aerodrome at Drama and against stations and dumps in the Struma area. One of the most successful took place on the 25th of May, when an ammunition dump at Livunovo was destroyed.

Two days later, on the 27th, disaster overtook the squadron. Five Sopwiths had been wheeled out on the aerodrome at Marian and loaded with bombs for a projected attack, but the weather proved unfavourable and, eventually, the aeroplanes were put back in the hangar, where they were left in readiness to set off immediately the weather conditions improved. In the same hangar as the bomb-loaded Sopwiths were three single-seater fighters, with four men at work on them. Suddenly there was an explosion and within a few seconds the hangar was a furnace. Other explosions followed as the bombs were

detonated, and the flames spread to a small nearby hangar in which two aeroplanes were housed. Both hangars, with their contents, were destroyed within three minutes. In addition to the four men killed in the hangar, four other mechanics and one soldier who were on the aerodrome were wounded. It is impossible to say how the accident happened. The armourer artificer in the main hangar, who had expressed an intention to test the bomb-release gears, was a man of experience and proved caution, and the fan safety devices were supposed to render harmless any bomb dropped from a height less than 200 feet, so that even if a bomb accidentally fell off its rack inside the hangar no explosion should have resulted. Precautions were taken to prevent the enemy from obtaining knowledge of the disaster: signs of the fire were removed and talk of the accident was forbidden. The activities of the air services on the Macedonian front, especially subsequent to the arrival of the German bombing squadron, formed a topic of general conversation wherever army officers met together, but it was many weeks before rumours began to spread about the Marian disaster.

The Battle of Dojran

Meanwhile the preparations by the XII Corps for an attack on the Dojran front, between the Vardar and the lake, as part of a general Allied offensive, had proceeded quietly. At the beginning of February No. 22 Balloon Company, made up of Nos. 26 and 27 Sections, had arrived at Salonika. Early in March the two sections moved to the Dojran front and came under the orders of the XII Corps, No. 26 Section working from a position near Hirsova and No. 27 from Kalinovo. The balloons, which were employed mainly to facilitate observation for the fire of the artillery, were frequently attacked by German aeroplanes and were also occasionally shelled. The balloon of No. 27 Section was shot down in flames on the 30th of March, but its two occupants escaped by parachute. The balloon was immediately replaced and the two sections continued to give help to the artillery, by night as well as by day. A panorama of the country from the

Vardar river to Lake Dojran, photographed from one of the balloons, was used by the XII Corps staff in connexion with the plans for the offensive. There was also on the staff of the balloon company an artist, Corporal W. T. Wood, who made, from the basket of the balloon, many sketches and pictures of the enemy lines which proved of value to the Corps staff.¹ Towards the end of April German aircraft were once more active against the balloons, on which they made daily attacks. On the 1st of May, when the balloon of No. 27 Section was up in ballast at about 1,800 feet, two Halberstadt fighters approached. Only one attacked and, soon after opening fire, the German aeroplane was hit by an anti-aircraft shell and fell out of control; it burst into flames on reaching the ground.

The aeroplane observers of No. 47 Squadron gave most of their time to the work of co-operation with the artillery. That co-operation, however, was inadequate, and to understand the general position it will be necessary to consider the broad plans for the offensive. The object of the British attack at Dojran was to draw enemy reserves from the neighbourhood of Monastir in order to facilitate the main Allied offensive which was to be made in that area. General Sarrail had stated that this offensive would begin about the 8th of April, and Lieutenant-General Milne had completed most of his preparations by that date. The British commander-in-chief was then told that the main attack would have to be postponed until the 15th, and later again that it must be put off until the 26th.

The British operations were timed to take place two days before the main attack, and the artillery of the XII Corps began preliminary wire-cutting fire on the 21st.

The postponement helped the artillery because it gave more time for counter-battery work and registration, but nothing like enough preparation was possible with the resources at the disposal of the XII Corps commander. The terrain was unsuited to ground observation. If aero-

¹ Subsequently Mr. Wood also made many useful sketches on the front of the XVI Corps. Some of his pictures of the Macedonian landscape are printed as illustrations in *The Salonika Front* by W. T. Wood and A. J. Mann.

planes could not be supplied, or if the balloon observers were otherwise engaged, accurate registration, or fire for destruction, was for the most part impossible. From the British front-line trenches west of Lake Dojran the country rose in a tumble of hills, broken by deep ravines, to the dominating Grand Couronné on which was an observation post that gave the enemy a view over the British area, a view limited only by the conditions of the atmosphere. Bounding this tumble of hills, and outstretched like an arm pointing into the British lines, was the steep-sided 'P' ridge with its highest point over 2,000 feet, from which again almost unlimited observation of the British positions was obtainable. Except in rare instances the enemy did not need observation from the air. His artillery observers could survey the ground all day and every day at their leisure, and could, undistracted, direct the fire of their batteries over the telephone.

Furthermore, the Bulgarian infantry could await developments in the belief that their defensive positions, immensely strong because of their natural advantages, had been made almost impregnable by military science. And the troops holding the Dojran front were those of the Bulgarian 9th Division, the finest in the Bulgarian army and one which, by its record in the war, proved itself in training and morale inferior to none.¹

On the morning of the 24th of April a Bulgarian soldier deserted to the British and gave the news that his battalion had been warned to expect an attack at 8 p.m. that evening. The information was at once conveyed to the XII Corps commander, and by him to Lieutenant-General Milne, but the British commander-in-chief decided to make no alterations in the programme for the attack. No great measure of surprise was possible owing to the preliminary bombardment and because the preparations for the battle could not be concealed from the enemy observation posts on the high ground. The attack began at 9.45 p.m., and it succeeded in attracting some enemy reserves—one of

¹ When in 1918 the Bulgarian front was broken and the armies of the Central Powers on the Macedonian front began to disintegrate, the 9th Division maintained an unflinching resistance.

the objects for which it was made. It had been planned, however, as subsidiary to the main Allied effort to take place two days later, that is, on the 26th, but on that day General Sarrail told Lieutenant-General Milne that the main artillery bombardment could not begin until the 28th and that the infantry attack would follow later. Bad weather, which brought unprecedented snow west of the Vardar, caused a further postponement. In other words the British attack on the 24th, which took heavy toll of some of the best battalions in the British Salonika army, was, through the inability of the French command to keep to the pre-arranged plans, to some extent a waste of effort.

The French artillery preparation was timed to begin on the 5th of May, and Lieutenant-General Milne instructed the XII Corps commander to continue offensive operations at Dojran. The new attack, which took place at 9.50 p.m. on the 8th of May by moonlight, was by way of being a repetition of the attack on the 24th of April, and it fared no better.

The main reasons for the lack of success were that the enemy artillery was insufficiently countered and that there was a paucity of information during the attacks. There was also much confusion in the darkness because of the difficulties of the ground, and the first of the two attacks was made in face of the disadvantage that the enemy knew when to expect it and was able to put down an effective barrage before the infantry assaulted.

Adequate aeroplane co-operation might have gone some way to eliminate the underlying causes for the failure. To say this is to cast no reflection on the work of No. 47 Squadron nor on that of the balloon observers. They did the utmost that was possible, and it should be remembered that No. 47 Squadron had, during the preparatory period, to play its part in countering the German bombing squadron. Even, however, had it been possible to employ the full strength of the squadron to help the artillery, that help would still have been inadequate because it had to be spread over too wide a front of very difficult country.

So far as concerns the actual attacks, the Royal Flying Corps could take no part. The infantry assaulted at night because the enemy completely commanded the ground and daylight attacks were out of the question. Had the attacks been made just before dawn, however, it should have been possible, once they were under way, for the artillery to bring fire to bear with the help of the air observers. It might have been possible, also, by direct observation from above, supplementing that from the ground, to keep the commands informed of the general progress of the battle. Furthermore, much of the confusion, due to the dark, would have been avoided if there had been just light enough for the assaulting infantry to be aware of what was happening in their immediate neighbourhood. It should be remembered that the Bulgars employed an unusually large number of searchlights along the Dojran front and were able, at their will, to do something to minimize the advantages, such as they were, of a night attack.

On the other hand, it must be pointed out that a dawn attack would have had elements of great risk. Had it gone swiftly, and strictly according to time-table, there might have been no disadvantages as compared with a night attack. Had the assault, however, been held up while approaching daylight laid bare the whole position to the numerous enemy observers in the posts overlooking the British area, failure was certain and the casualties before and during extrication must have been very high. Nor could the British commander-in-chief give much weight to the air arm when he assessed the relative advantages and drawbacks of dawn and night attacks, because the aeroplanes at his disposal were nothing like enough to exert an important influence.

On the 12th of May, after the second Dojran attack had ended, the B.E.12's of No. 17 Squadron were withdrawn from the composite squadron and were flown to the Lahana aerodrome in connexion with operations by the XVI Corps in the Struma valley. There was, in consequence, some reorganization on the Dojran front. No. 47 Squadron gave up the aerodrome at Snevche and

the detached Flight ('B') moved to Yanesh, while a Flight ('A') of D.H.2 Scouts went from Yanesh to Hadzi Junas to take the place of the B.E.12's of No. 17 Squadron withdrawn to Lahana.

The British attacks, which had been planned as subsidiary to the Franco-Serbian offensive, were still in progress on the Struma front on the 21st of May when, owing to the complete failure of the main offensive, General Sarrail ordered that operations should cease. As a result the British commander-in-chief put a stop to the attacks in the Struma area. Furthermore, he decided that he would not leave the troops of the XVI Corps to spend another summer in the malarial valley, and he gave orders that preparations to fall back on a summer line in the hills should be begun. When the line was completed and occupied, outposts were left on the enemy side of the Struma.

In June the Allies, under French leadership, at last took action calculated to put an end to the political uncertainties in Greece. That unhappy country was divided into two camps. King Constantine at Athens, and the Royalists generally, although ostensibly neutral, were really pro-German, whereas M. Venizelos had set up at Salonika a Provisional Government which had declared war on Germany and Bulgaria. Allied pressure forced the King to abdicate in favour of his second son, Prince Alexander, a step which roused some indignation in Greece, but no armed resistance, and by the end of June M. Venizelos had arrived in Athens to take over the full reins of government. From that time onwards the political atmosphere in the Aegean cleared and the Greek army began to take its place beside the Allies in Macedonia.

Throughout the remainder of 1917 there were no major offensive ground operations on the Macedonian front. There were a few minor raids, but the chief activity, so far as the British armies were concerned, was in the air. There were almost daily bombing attacks by Nos. 17 and 47 Squadrons, usually made by formations of seven or eight aeroplanes. The more important targets were Drama, Angista, and Porna stations on the Constantinople

railway; camps at Tushchulu north-east of Lake Butkovo, and the Bulgarian Second Army head-quarters at Sveti Vrac beyond the Rupel pass; Dedeli, the head-quarters of the Bulgarian First Army; depots at Petric, in the valley of the Strumica, and at Cerniste, Platanenwald, and Cestovo in the Dojran area; and the aerodromes at Drama, Livunovo, Gereviz, and Hudova. A typical example of these attacks may be given. On the morning of the 5th of June seven aeroplanes of No. 17 Squadron crossed the Belasica mountains at 6,500 feet and attacked the camps at Sveti Vrac, on which 1,500-lb. weight of high explosive and twenty-two small incendiary bombs were dropped. Five sheds and nine tents were destroyed, some of them by fire, and one 112-lb. bomb exploded in a mechanical transport park. The pilots did their work in a leisurely manner, taking careful note of the targets before releasing their bombs, but although they were in the air over the targets for nearly half an hour, within sight of the German aerodrome at Sveti Vrac, no enemy pilots rose to meet them. There were, however, many occasions when the German fighters fiercely disputed the raids.

On the morning of the 9th of August enemy guns opened accurate fire, without warning, on the aerodrome of No. 17 Squadron at Orlyak, the opening rounds falling on the officers' lines and on the hangars. An attempt was made to move the aeroplanes, but the remarkable accuracy of the fire made this impossible and two aeroplanes, two hangars, and a workshop lorry were destroyed. The shelling lasted half an hour, during which 250 rounds fell, but the personnel had sought shelter in a nullah and no casualties were caused. The positions from which the enemy guns were firing were quickly discovered in Kalendra wood, and they were bombed by two aeroplanes and shelled by XVI Corps heavy guns, with the result that the bombardment ceased. The aerodrome at Orlyak was evacuated by 'C' Flight which moved to Lahana. At the same time 'B' Flight, which had arrived from the Salonika aerodrome at the beginning of July, moved from Marian to Amberkoj.

On the Bulgarian flank along the Struma, the Royal

Naval Air Service from Stavros and Thasos, and a Greek Bombing Squadron continued to operate.¹ From the enemy aerodrome and seaplane base at Gereviz, near Xanthe, German pilots made frequent bombing attacks on the aerodrome at Thasos. The Royal Flying Corps co-operated with the naval pilots and with Greek pilots in a series of attacks on the base. Five aeroplanes from No. 47 Squadron together with seven from No. 17 Squadron assembled at Marian aerodrome and flew in formation to Thasos, under the command of Major J. H. Herring, on the 10th of August. They arrived in the evening and, next day, with three naval aeroplanes, made two attacks on Gereviz, during which bombs of a total weight of 3,374 lb. were dropped. In the morning raid, one of the naval pilots, who was acting as escort, held too far back and during an attack by three Halberstadt fighters was wounded. Otherwise the raids passed without incident, all pilots maintaining close formation which sufficed to keep at a distance such German fighters as took the air. The Royal Flying Corps pilots left Thasos immediately after returning from the second raid and reached the aerodrome at Salonika the same evening.

In the middle of August the Royal Flying Corps was asked to help the French air service in the Monastir area, where German pilots had for some time been aggressively active. A number of aeroplanes from Nos. 17 and 47 Squadrons, under the command of Major J. H. Herring, were flown to the French aerodrome north of Florina on the 16th of August, but owing to high winds on subsequent days the full bombing programme which had been arranged could not be fulfilled. On the 17th and 18th the German aerodrome at Kanatlarci and billets in the area, and on the 19th the dumps at Topolcani and head-quarters buildings in Prilep, were attacked. During the night of the 19th Major Herring bombed Prilep alone, and on the morning of the 20th the head-quarters in the town was again attacked by five bombers with an escort of three Nieuports of No. 17 Squadron. A French escorting squadron failed to find the British formation which was fiercely attacked

¹ See pp. 401-2.

and had to fight hard to get back. One of the escorting Nieuports, piloted by Lieutenant J. L. Bamford of No. 17 Squadron, was shot down over Prilep and the pilot was killed. The only two-seater with the British formation, an Armstrong-Whitworth of No. 47 Squadron, covered the rear of the bombers and bore the brunt of the attack, but although the pilot, Lieutenant F. W. H. Thomas, was mortally, and his observer (Lieutenant H. A. Jones) seriously wounded as soon as the fight began, the Armstrong-Whitworth maintained its position until its guns were shot out of action, when it fell out of control with the pilot unconscious. Lieutenant Thomas recovered near the ground many miles behind the enemy lines and, although semi-conscious and partly paralysed, piloted the damaged aeroplane safely to its aerodrome, where he landed fifty minutes after receiving his wounds.

The Nieuport fighters flown during the bombing attacks from the aerodrome at Florina were French aeroplanes temporarily loaned. The British types in use in Macedonia were inferior in performance both to the French and the German fighters. Those with which Nos. 17 and 47 Squadrons were equipped were types which had long since become obsolete on the Western front. For instance, in September 1917 the fighters at the disposal of the squadrons were B.E.12's, D.H.2's, and Vickers 'Bullets'. A year before, that is to say in September 1916, Major-General Trenchard had reported from France that the B.E.12 was 'incapable of useful work against the hostile fighters', and the D.H.2 had become outclassed in France in the same month, while the Vickers 'Bullet' had never been recognized as good enough for the Western front. The Germans followed no such policy of allocating inferior aeroplanes to secondary theatres of war. In Macedonia, as on other fronts, new types usually appeared without delay, and the result was that, with far fewer aircraft than were available to the Allied armies, the German air service could usually do what was essential. For the most part the armies on the ground, Bulgar or German, had, as we have seen, excellent observation posts overlooking the Allied area, so that much of the work of aircraft

co-operation with artillery, &c., such as the Royal Flying Corps had to do, was unnecessary. When air reconnaissances were required, no matter how far over, the Germans sent an aeroplane better in performance than anything it was likely to meet.

There was an incident in September which illustrates this statement. On the 10th, a day of fine visibility, a German aeroplane appeared over the front, high up, and began to direct enemy guns on a target. Many fighters ascended, but the best of them reached their 'ceiling' at about 16,000 feet, where they were still well below the German aeroplane which, indifferent to the long-range machine-gun fire coming from below, continued to direct the enemy artillery for as long as was necessary. Thus is provided another minor example of the importance of the technical factor in air warfare.

The battles of Coronel and of the Falkland Islands illuminated the importance of speed at sea. But even at sea, and still more on land, there may be obstacles, natural or artificial, affecting freedom of movement which, in any event, is confined, outside submarine warfare, to two dimensions. According to how far the obstacles are effective, so might technical or other superiority be discounted. In the air, however, technical qualities have, for all practical purposes, unimpeded scope. A difference in maximum height (or 'ceiling'), which need be little more than the effective range of contemporary aircraft weapons, will enable a pilot to fly at his will in defiance of any number of opponents. It may be emphasized once again that air superiority cannot be assessed merely by counting aeroplanes. It should, however, be made clear that a spirited bombing offensive, subtly planned, waged against vital enemy objectives, may go some way to throw an enemy, temporarily better equipped, back on the defensive. There is the all-important moral factor. So long as an air force is imbued with the offensive spirit, so long may it find ways to assert its will and thereby discount something of the technical superiority of an enemy.

In the afternoon of the 18th of August a fire broke out in the old town at Salonika and, swept along by a strong

Vardar wind, roared through the Turkish quarter, leaped the Rue Egnatia to the new town, and spread until it reached the water's edge. By the morning of the 21st, when the fire finally subsided, nearly half the city had been destroyed and eighty thousand civilians had been rendered homeless. The British military authorities, in common with their Allies, helped to house and feed the refugees. For the rest of the war Salonika, which had provided colour and distraction for officers and men on their occasional leave from the front, was mainly a place of desolation.

The two Royal Flying Corps squadrons continued, throughout the autumn and winter, to make bombing attacks in the intervals of providing the necessary co-operation for their respective army corps. Had the Germans wished they might, by vigorous attacks whenever the bombers were signalled, have gone some way to stop the raids. As it was, whenever they did attack with determination, they usually took toll. On the 5th of October, for example, four enemy aeroplanes attacked the rear of a formation after it had dropped bombs on Cestovo dump. The pilot of one of the bombers, Lieutenant G. C. Gardiner of No. 47 Squadron, was wounded in the leg, but he successfully landed his aeroplane in which the engine had been shot out of action. Again on the 29th, when five aeroplanes of No. 47 Squadron were once more attacking the Cestovo dump, eight Albatros and Halberstadt fighters rose to meet them from the nearby aerodrome at Hudova and, in a fiercely contested fight, Second Lieutenant P. D. Montague in a B.E.12, and Second Lieutenant J. R. F. Gubbin with Air-Mechanic T. H. Bury in an Armstrong-Whitworth, were shot down.¹

¹ A subsequent message, dropped by an enemy aeroplane on Yanesh aerodrome, read: 'On the 29th October, 1917, one of your comrades met with a hero's death in an air fight. He was buried with due honours and a memorial stone has been put up over his grave, but without an inscription 'as his name is not known to us. In order that we may make good this 'deficiency kindly inform us as to his name and the date and place of 'his birth.' This message, similar in tone to many others giving news, from time to time, of missing personnel, referred to Second Lieutenant

In November the enemy made a number of retaliatory bomb raids and twice attacked the aerodrome of No. 17 Squadron at Lahana, but without causing damage. Attacks on balloons were also intensified about the same time. On the 28th of October the balloon of No. 17 Section was shot down in flames, but the observer escaped by parachute. On the 9th of November the same section's balloon was again attacked, unsuccessfully, but the observer, Captain C. H. Gimingham, was seriously wounded and unable to toggle the harness on the parachute, with the result that he fell away from it, after jumping, and was killed. Once again, on the 15th, the section's balloon, while up in ballast, was destroyed in flames. Because of these insistent attacks, and because there were no fighting aeroplanes which had the performance to overtake the German pilots, it was decided to send up an unserviceable balloon with 500-lb. of explosive packed in the basket. Two detonators were fixed and contact wires to the ground were arranged. On the morning of the 21st of November the balloon, so loaded, was in the air when a German aeroplane was seen to be approaching. The observer, at the switch on the ground, waited until the enemy pilot had dived within close range of the balloon when he fired the charge, which immediately exploded and caused the German aeroplane to break up. From the wreckage the body of the pilot was recovered, and it was learned, from documents found on the body, that he was Leutnant von Eschwege, the foremost German fighting pilot on the Macedonian front who, among his twenty victories, had claimed many missing pilots from Nos. 17 and 47 Squadrons as victims. He came by his end as a result of a legitimate ruse of war, but there was no rejoicing among the pilots of the squadrons which had suffered from his activities: they would have preferred that he had gone down in fair combat. Among those he had killed were some who had challenged him, even though he had the advantage of an aeroplane which was an all-round better fighting weapon than anything flying against him, Montague. It was afterwards known also that Second Lieutenant Gubbin had died of his wounds.

an advantage which he had the will and the skill to exploit to the full. The Royal Flying Corps in Macedonia was not much longer to suffer the handicap of inferior aeroplanes and, after the new fighters were taken into service, regrets were often expressed that Eschwege was no longer there to be challenged.

Bombing and counter-bombing continued, much of it taking place at night, with pilots making two or more journeys. In a German night attack on Yanesh aerodrome on the 28th of November four mechanics were wounded, but no material damage was inflicted. Occasionally combined bombing attacks were arranged. In one, which took place in daylight on the 15th of December, twenty-one aeroplanes of Nos. 17 and 47 Squadrons, accompanied by eight French escorting single-seaters, dropped 1,848 lb. of bombs on the railway station and dump at Cestovo.

The first of the aeroplanes which were to change the air position on the British front in Macedonia arrived during the winter. Writing early in September to the War Office, Lieutenant-General Milne had pressed for an increase in the air service at his disposal. 'I am responsible', he said, 'for a wide extent of front, which entails heavy demands on the Flying Corps for reconnaissance, photography and artillery observation. In addition to this, offensive bombing raids are undertaken as often as possible, and there is constant fighting in the air with an enemy whose machines are more up to date than our own. I am anxious to widen the scope of the offensive measures undertaken by the Flying Corps, the more so as the size of my force precludes any other method of making our presence really felt in this country. . . . I would strongly urge that the Royal Flying Corps in this country should be reinforced by a strong bombing squadron with a suitable proportion of the most up-to-date fighting machines, and I am of opinion that such a squadron, if properly used, would cause great damage to the enemy's communications and military establishments, and would in consequence have a lasting impression on his troops and on his people, who have as yet hardly realised the stress of war.'

The Chief of the Imperial General Staff had replied that all aircraft were required for operations on the Western front, and that when those operations had been concluded the question of the allotment of modern-type aeroplanes to the Salonika force would be reconsidered. On the 12th of October 1917 the War Office telegraphed that the establishment of the two squadrons in Macedonia might be increased to twenty-four aeroplanes, but that only one Flight in each squadron might be maintained as an up-to-date single-seater fighter Flight. Nine S.E.5a's, it was stated, had been allotted and would shortly be dispatched. Up to the spring of 1918, Lieutenant-General Milne had to be content with these few S.E.5a fighters, together with some Bristol monoplanes, as his aeroplane reinforcement. The first of the S.E.5a's arrived about the beginning of December 1917, but it was not until February 1918 that each squadron had four; nor were more than four available to each at any time.

The main excitement in January 1918 was connected with the running aground of the cruiser *Goeben* after her sortie, in company with the *Breslau*, from the Dardanelles. On the 21st of January the wing commander was informed that Lieutenant-General Milne had received a request for help from the navy, and it was agreed that six bombing aeroplanes should be sent at once. Three B.E.12's of No. 17 Squadron left Salonika for Mudros, two hours after the request had been received, and three more, of No. 47 Squadron, flew down from the front to Salonika the same evening and continued to Mudros next day. A store of 112-lb. bombs, and a supply of petrol, both of which were urgently needed at Mudros, were sent by destroyer on the 21st. In response to a further request from the naval authorities, four more bombers set out on the 25th. The navy had also inquired whether an aeroplane could be supplied capable of carrying a 450-lb. depth-charge bomb. As the Royal Flying Corps had no such aeroplane, the French were approached and at once offered to lend an *A.R.* bomber if the Royal Flying Corps would supply a pilot. This aeroplane was flown to Mudros on the 28th by Lieutenant W. J. Buchanan.

By that time, however, the *Goeben* had left. She had been attacked by the aeroplanes of Nos. 17 and 47 Squadrons, by day and night, as well as by naval aeroplanes, from the 22nd to the 24th inclusive. On the 25th the weather was bad and an attempted raid failed: gales continued for the next three days and no attacks were possible, and then, when the visibility cleared on the 29th, it was seen that the *Goeben* was no longer aground. She had suffered no appreciable damage from the 15 tons of light-weight bombs aimed at her.¹

When the aeroplanes returned to the mainland, the bombing offensive in Macedonia continued unabated. Aeroplanes of No. 17 Squadron occasionally joined those of No. 47 in attacks on military objectives east of the Vardar. On the morning of the 12th of February twenty pilots from the two squadrons bombed the dump at Cestovo and fires were started which were still burning some hours later. Photographs taken next day showed that a great part of the dump, presumed to have contained ammunition, had been destroyed.

Meanwhile, on the Struma front, the two available S.E.5a's of No. 17 Squadron, usually flown by Captain F. G. Saunders and Lieutenant G. E. Gibbs, had made clear to the enemy that the day of untroubled reconnaissance from a great height was at an end. On the 22nd of January Captain Saunders forced a reconnaissance two-seater to land on a hill-side within the Bulgarian lines, and six days later Lieutenant Gibbs shot down another two-seater which crashed in Bulgar territory, where the wreckage was later bombed from the air. On the 31st, when there was a parade of troops near Orlyak, an air patrol was provided by Captain Saunders and Lieutenant Gibbs. While they were in the air at 14,000 feet a reconnoitring German two-seater approached the parading troops. It was promptly attacked and eventually crashed inside the Bulgar lines. On the 5th of February both these officers, flying in company, attacked two enemy aeroplanes and sent them down out of control through the clouds. In the afternoon of the same day, Captain

¹ See also pp. 410-14.

Saunders ascended on receipt of a report that an enemy aeroplane was working over the front line. He came up with it and shot it down in flames, the pilot and observer throwing themselves from the burning aeroplane at 8,000 feet. The air fighting in subsequent weeks was of a similar kind. A few up-to-date fighters, in the hands of experienced pilots, had sufficed to give the Royal Flying Corps a high degree of local superiority. What was notable also was that even when British aeroplanes of poor performance were engaged on duties on which they could easily have been attacked, no attempts were made to molest them.

In the middle of February there was a great snow-storm which severed telephonic communications along the front and closed many traffic routes. A Bessoneau hangar on the aerodrome of No. 47 Squadron at Hadzi Junas collapsed under its weight of snow with the result that three aeroplanes were destroyed and four damaged. On the Struma front the enemy was forced, owing to road blockages due to snowdrifts, to concentrate the passage of supplies along the railway which crossed the river by a bridge near Angista. Day and night bombing attacks, which had for object the destruction of the bridge, were made by No. 17 Squadron, but no direct hits were obtained.

On the morning of the 27th of February two S.E.5a's from No. 17 Squadron crossed the lines at 16,000 feet, turned behind the mountains, and then dived for the aerodrome at Drama. The enemy was taken by surprise. Each pilot dropped two 20-lb. bombs, from a height of 100 feet, on the aerodrome, and then, going down within a few feet of the ground, the pilots fired their machine-guns against troops running for cover, and into the hangars. Subsequently, for a few minutes, the pilots circled over the aerodrome under desultory anti-aircraft gun and machine-gun fire, but no enemy aeroplanes ascended to challenge them.

By the spring of 1918 the Germans had realized the danger of sending two-seater reconnaissance aeroplanes over the lines without protection. Such two-seaters as

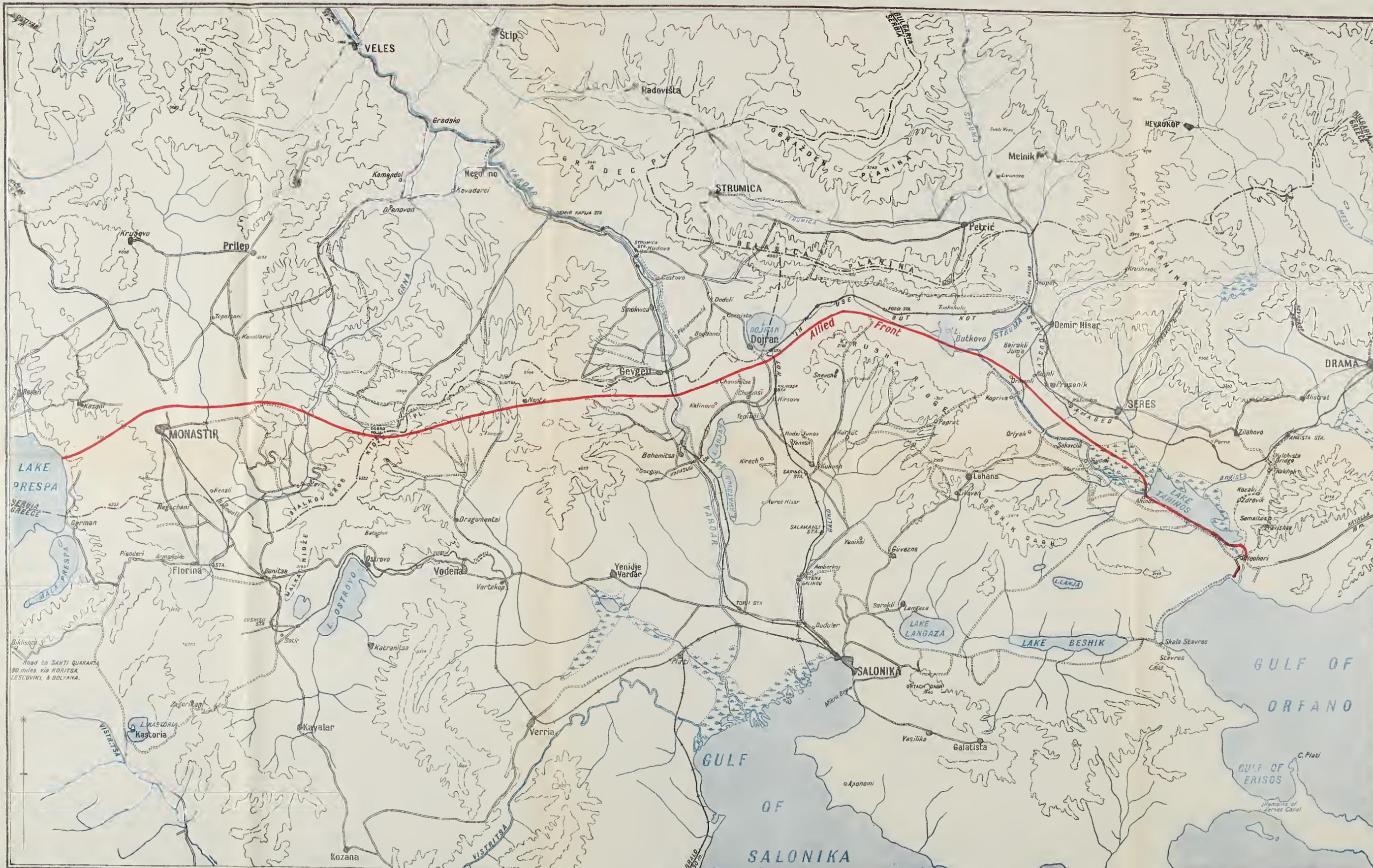
were encountered from March onwards usually had escorts of three or more Albatros fighters, although for long-distance work, for which the German fighters had not the range to enable them to give continuous escort, the two-seaters, after being escorted part of the way, flew on to their destination unaccompanied. On one occasion, on the 13th of March, Captain G. E. Gibbs, while flying with bombing aeroplanes to attack the Cestovo dump, sighted a formation of seven Albatros fighters in the distance. He flew off and unhesitatingly attacked them and he ultimately shot down one which fell into Lake Dojran. A week later the same pilot, in company with Lieutenant A. G. Goulding in another S.E.5a, pursued and attacked a reconnoitring German two-seater, flying alone. After some time the observer in the two-seater stood up and waved a white handkerchief in token of surrender. The British pilots thereupon withheld their fire and shepherded the enemy aeroplane to the ground, where it was captured intact with its crew within a few miles of the lines.

On the 1st of April, the day of the formation of the Royal Air Force, a fighting squadron, No. 150, was formed in Macedonia, and Nos. 17 and 47 Squadrons became corps squadrons, concerned mainly with the business of co-operation with their respective corps, although they were still responsible for long-distance reconnaissance and for bombing operations. No. 150 Squadron, under the command of Major W. R. B. McBain, formerly of No. 47 Squadron, took over 'A' Flight from No. 17, and 'A' Flight from No. 47 Squadron. The third Flight of No. 150 Squadron was formed independently at the beginning of May. The aeroplanes taken over on formation were S.E.5a's and Bristol monoplanes, with some Nieuport Scouts which had been acquired from the French air service. At the beginning of May the squadron received a few Sopwith 'Camels'. Its record, as will appear in a subsequent volume, was a fine one.

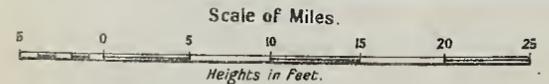
After the unsuccessful offensive in the spring of 1917, directed by General Sarrail,¹ the armies in Macedonia had

¹ General Sarrail was succeeded in the command in Macedonia on the 22nd of December 1917 by General Guillaumat.

MACEDONIA



Compiled in the Historical Section (Military Branch), 310155.



Ordnance Survey 1935.



stood on the defensive. It has been made clear, however, that, in the air, the offensive was maintained without intermission. The two squadrons in Macedonia had unique opportunities. Long after specialization was common on other fronts, with separate squadrons for fighting, bombing, and long-distance reconnaissance, the pilots and observers of Nos. 17 and 47 Squadrons did whatever was required, whether by the corps or by the army staffs. Aeroplanes which had, perhaps, been employed on the work of artillery co-operation in the morning, carried bombs in the place of an observer in the afternoon and took their station in a bombing formation. Other two-seaters, notably the Armstrong-Whitworth with the 140 horse-power engine, were variously used for long-distance photography or visual reconnaissance, for artillery co-operation, and to provide escorts for bombing or other formations. The two squadrons operated over the wide front covered by the ninety miles of the British line, but they were also called upon to supply detachments for bombing attacks in the area of Monastir at one end of the Macedonian front, and at Gereviz at the other, while chance took them to the Dardanelles at the time when the *Goeben* was aground. The life of those taking part in the air war in the Macedonian mountains was filled with interest and colour.

CHAPTER VII

NAVAL AIR OPERATIONS IN THE MEDITERRANEAN AND NEAR-EASTERN WATERS

1916—March 1918

[Map, p. 422]

As a result of a naval convention which had been concluded with France in August 1914, the command of the Mediterranean had become a French responsibility. The entry of Turkey into the war, however, had brought about a change and the French naval authorities had agreed to the withdrawal of the Dardanelles and Egyptian areas from their control. Subsequently, because of the threat to the Suez Canal, the Commander-in-Chief, East Indies Squadron (Vice-Admiral Sir Richard H. Peirse), had been instructed to shift his head-quarters from Bombay to the Canal, and in December 1914 he had rehoisted his flag in the *Swiftsure* at Suez. He had been given the responsibility for the defence of Egypt from the sea, and it was not long before he proposed that his sphere should be extended to include the whole coast road from El Arish to Mersina, and, particularly, Alexandretta. In this the French had concurred, and the French patrol in the Eastern Mediterranean had accordingly been restricted to the area between Mersina and Smyrna. When, however, the naval operations against the Dardanelles had begun in February 1915, the coast of Syria, and of Palestine as far south as Jaffa, had reverted to the French, at their request, and Vice-Admiral Peirse had received instructions to act in conjunction with, or under, the French admiral so far as concerned operations along the Syrian coast.

The naval war in the Eastern Mediterranean again changed its character at the end of 1915. In October the Allied force had landed at Salonika, and a new theatre of war had been opened. Subsequently, as a result of the evacuation of the Gallipoli Peninsula, there was an increasing concentration of troops in Egypt. There was thus a shifting and an expansion of the responsibilities

of the Allied fleets for the security of the sea routes through the Mediterranean at a time when German U-boats were intensifying their activities. In December 1915 representatives of the Allied navies met in Paris to confer upon the Mediterranean situation, and their discussions showed that the French and British staffs were divided upon the protective measures which should be adopted. The British view was that shipping should be diverted to definite routes patrolled by swarms of light craft, but the French, convinced that German submarines were using the deserted creeks of Crete and Asia Minor as operating bases, wished to set aside old cruisers to search every creek in the eastern basin. After much argument it was ultimately decided that the Mediterranean should be divided into eighteen areas, or zones, of which four were allotted to the British, four to the Italians, and ten to the French. The French Commander-in-Chief was made responsible for arranging the general transport routes, and the senior naval officer in each zone was given the duty of patrolling the section of the route in his zone with such forces as he had at his disposal. The Paris conference was followed by another held at Malta in March 1916, at which the admirals with local commands in the Mediterranean attended. At this meeting Vice-Admiral Sir John M. de Robeck, commanding the Eastern Mediterranean Squadron, pressed for a redistribution of the zones on the plea that his squadron could undertake larger responsibilities now that it was free of the Dardanelles operations. In the result the whole of the transport route from Malta to Egypt was made a British responsibility, and the zone allotted to the Eastern Mediterranean Squadron was extended to include the coast of Asia Minor as far south as Cape Alupo, the island of Crete, and Euboea. An important recommendation of the Malta conference was that all aircraft bases in the Mediterranean should be placed under a central organization. No steps, however, were taken to give effect to this recommendation, and the Allied aircraft continued to be used according to the particular ideas of the admirals of the various local commands.

The Eastern Mediterranean in 1916

After the evacuation of the Gallipoli Peninsula in January 1916, the strategic role of the naval force in the Eastern Mediterranean was 'to watch the Dardanelles, 'and safeguard the Greek islands in our occupation, to 'maintain the blockade and submarine patrols in the 'Aegean, and to support the army at Salonika'.¹ It was also hoped, by offensive operations against the Smyrna defences and against various points along the coast of Asia Minor, to induce a state of mind which would prevent the Turks from moving guns and men to other fronts.

With the ending of the Gallipoli campaign much of the work hitherto undertaken by the Royal Naval Air Service was no longer necessary, and Vice-Admiral de Robeck stated that the air requirements arising out of the new naval policy in the Eastern Mediterranean would be met by one aeroplane wing at Imbros, one airship base at Mudros, two seaplane carriers, and two kite-balloon ships. Accordingly Wing Captain F. H. Sykes and his headquarters staff, together with No. 3 Wing, returned to England.

No. 2 Wing, under Wing Commander E. L. Gerrard, which comprised three Flights, each of ten aeroplanes, remained at Imbros to keep watch on the Dardanelles, to spot for ships of the fleet during bombardments of Turkish gun positions, &c., and to bomb, as opportunity offered, enemy aerodromes, camps, and other suitable targets. The aircraft carrier *Ben-my-Chree* had been transferred from the Eastern Mediterranean to Egypt,² while the *Ark Royal*, with five 200 horse-power Short seaplanes and two Sopwith seaplanes, was at Salonika, where she had been sent in November 1915 in consequence of the critical situation in that area arising from the unsatisfactory attitude of the Greek Government.³ The kite-balloon

¹ See *Naval Operations*, by Sir Henry Newbolt, Vol. IV, p. 128.

² See p. 379.

³ The seaplanes in the *Ark Royal* were mainly used for reconnaissances of the dispositions of the Greek army. Anti-submarine patrols were also made over the Gulf of Salonika. On the 18th of January 1916 the carrier

ship *Canning* was also at Salonika, and the *Hector*, the second available vessel of this type, was lying in Mudros harbour because, owing to the increased range of the Turkish guns mounted near the coast, and to danger from submarines, she was no longer of use for spotting operations in the Dardanelles area.¹ The airship station had been moved from Imbros in October 1915, and re-erected at Mudros, but the S.S. airship had not been inflated because it was thought that she would not be much use in the weather to be expected during the winter months.

Such was the general air position when Wing Captain F. R. Scarlett arrived in February 1916 to take command of the Royal Naval Air Service units in the Eastern Mediterranean. Soon after his arrival he formulated proposals for an expansion of the air activities. He suggested that an additional wing should be added to the command for offensive operations against the Turkish railway communications, &c., in the Smyrna and Scala Nuova areas. He also asked that the two kite-balloon ships should be replaced by two seaplane carriers, one to work on the right flank of the army at Salonika, and the other to operate between Mersina, Adana, Alexandretta, and Beirut. The *Ark Royal*, he pointed out, could no longer, owing to the activity of enemy submarines, be considered of value as a sea-going carrier, and he recommended that she be brought back from Salonika and based at Mudros as a repair and depot ship. Five of her seaplanes had already been detached to a temporary base at Stavros, at the request of the British military authorities at co-operated, particularly with the *Havelock*, in a bombardment of the railway junction at Bodoma. On the 28th of January, when Allied forces occupied the Kara Burun area overlooking Salonika harbour, the *Ark Royal's* seaplanes remained in the air in wireless touch with the naval squadron ready to observe for the fire of the *Prince George* if and when it was judged that naval action was necessary. (See *Naval Operations*, by Sir Henry Newbolt, Vol. IV, pp. 126-7.)

¹ The *Hector* returned to England in May 1916, and was converted as an ammunition carrier. On the 24th of May the *Canning* landed her kite-balloon section (No. 7) at Salonika for work on shore as a mobile unit with the 22nd Division, and she sailed for England with the wreckage of the Zeppelin LZ.85, which had been shot down at Salonika by the *Agamemnon* on the 8th of May.

Salonika, to make a photographic survey of the country in that area.¹

Wing Captain Scarlett further suggested that if a continuous air offensive was to be achieved in the Eastern Mediterranean it was desirable that all naval air units operating in the area should be under the orders of the Vice-Admiral, Eastern Mediterranean, and he went on to say that, unless this was arranged, 'the effort can only be 'spasmodic and a very great deal of its effectiveness will 'thereby be lost'. Vice-Admiral de Robeck, when forwarding the proposals to the Admiralty, notified his general concurrence, but said: 'I do not think it is desirable that 'all the units in the Mediterranean should be placed 'under my orders as suggested by the Wing Captain. The 'seaplane carriers based on Alexandria or Port Said must 'of course work under the orders of the Commander-in-Chief, East Indies, and during the time a seaplane carrier 'is based on Famagusta for operations on the Syrian coast, 'I think it would be advisable that she should be placed 'temporarily under the orders of the admiral commanding 'the French Syrian squadron.' With the views of the Vice-Admiral the Admiralty agreed, and with regard to the specific proposals, they stated that under existing conditions it was not practicable to expand the air service in the Mediterranean, and that the various units 'must 'be satisfied to work in restricted areas, however praise-worthy their intention to extend their operations may be'. It was suggested that when seaplane carriers were required for special operations in the Eastern Mediterranean they might be borrowed from the Commander-in-Chief, East Indies, who, at that time, had at his disposal the *Empress*, *Ben-my-Chree*, *Raven II*, and *Anne*. The Admiralty approved the retention of the *Ark Royal* as a depot ship, and agreed to maintain No. 2 Wing at one Flight of two-seater fighters (110 horse-power Clerget Nieuports), one Flight of reconnaissance aeroplanes (B.E.2c's) and two Flights of bombers (Henri Farmans). They further stated that as personnel and material became available two additional Flights would be allotted to the Eastern Mediterranean.

¹ The *Ark Royal* returned to Mudros in the middle of March 1916.

In March operations began in the Gulf of Smyrna with the object of attracting Turkish forces, particularly artillery, to that area where they would be more or less immobilized. An advanced base had been established on Long Island, inside the Gulf, and a British naval squadron, assisted by French aircraft, started a series of bombardments early in March. At the same time reports were spread that an Allied landing was about to be made, and the establishment of a French infantry division on Mitylene with a Flight of aeroplanes, and the setting up of aerodromes on Mitylene and on Long Island, was calculated to give colour to these reports. The balloon ship *Hector* was also sent to Mitylene to give spotting help to the bombarding ships.

In the middle of March the French aircraft were withdrawn from the Smyrna area to Salonika, and, to take their place, a British detachment of aeroplanes, known as 'B' Flight, was sent from Imbros to Mitylene, with an advanced detachment of two aeroplanes on Long Island. As a result of the bombardments of Smyrna, and of the open preparations for a landing of troops, Turkish reinforcements were diverted to the town and the defences were strengthened with new batteries and entrenchments. Among the guns mounted were some which commanded Long Island and its approaches, and on the 16th of May the monitor *M.30* was hit and set on fire by a shell. The landing-ground also suffered and the Bessoneau hangar and one aeroplane were wrecked. As a result, Long Island was evacuated and the air detachment was transferred to Thermi on the island of Mitylene. A second advanced base was opened at Khios at the end of June.¹

On the 6th of April 1916 the aircraft in the Eastern Mediterranean were reinforced by the seaplane carrier *Empress*, temporarily placed at the disposal of the Vice-admiral by the Commander-in-Chief, East Indies, for work with a detached naval squadron operating off the Bulgarian coast. Consequent on reports that the enemy intended to establish a submarine base on that coast, an

¹ The island of Khios had been occupied by British forces on the 17th of February 1916.

aerodrome was selected on the island of Thasos to form an advanced landing-ground from which naval aeroplanes from Mudros, and aeroplanes of the French Air Service from Salonika, could watch the coastal area.

On the 3rd of May 1916 an attempt by all available aircraft, including a French air detachment from Salonika, was made to bomb the enemy communications in southern Bulgaria, but the weather prevented the pilots from the more distant bases taking part, and the bombing was confined to seaplanes from Stavros and from the *Empress*, which attacked a bridge-building depot near the Mesta river, barracks at Ferejik, and barges at an alleged submarine base at Fener Point. A few days after this attack the *Empress*, still under the Vice-Admiral, Eastern Mediterranean, was sent south to Port Laki and she settled down to a routine of reconnaissance and bombing operations along the Asia Minor coast, south of Smyrna. On the 3rd of June a Short seaplane from the *Empress* spotted for the cruiser *Grafton* and the monitor *Earl of Peterborough* during a bombardment of the railway bridge, north-east of Scala Nuova; the range was ten miles and two hits on the bridge were made.

About this time diplomatic relations with Greece became strained. In May 1916 the Central Powers had occupied, without opposition, the Greek fort of Rupel, the key to the Struma valley, and the Allies had retaliated by assembling a punitive squadron in Milo Bay for action against Athens. The *Empress* was transferred to Milo on the 19th of June to provide aircraft, if and when necessary, for reconnaissance of the Greek fleet, but the Greek Government eventually acceded to the Allied demands and the 'pacific blockade' was raised on the 22nd of June. The naval squadron was thereupon dispersed and the *Empress* returned to Port Laki.

At the end of May a scheme for the redistribution of British naval aircraft in the Aegean had been approved by the Vice-Admiral. The policy on which the scheme was based was the provision of a suitable force of aircraft within striking distance of all points of the enemy coast from the Mesta river to Cape Alupo, the southern

limit of the patrol area of the Eastern Mediterranean Squadron. The main bombing force was to be mobile in order that the maximum strength might be concentrated rapidly in any specified area. A new aerodrome was prepared on a dried-up marsh near Mudros to serve as a testing and instructional ground, and also as a departure point for the bombing squadron. A unit, known as 'D' Flight, was transferred to this aerodrome (Marsh aerodrome) from Imbros on the 2nd of June.

About the same time a repair base was started at the airship station at Mudros. 'We collected', says Lieutenant-Colonel L. H. Strain, who was Wing Captain Scarlett's staff officer, 'lathes and other machines from various ships, 'bedded down a motor lorry in concrete to drive the 'machines, and not only repaired aircraft, but built new 'ones from the foundation. In addition to our own riggers 'and mechanics we employed a large number of Greeks. 'One of the best efforts of the Repair Base was when we 'wanted a regular ferry service between Repair Base and 'the various stations . . . No ship could be spared so we 'raised *El Piniki*, a small Greek cargo boat with Denny 'engines, which had been sunk as a harbour guard, repaired 'her and reconditioned her engines, manned her, and used 'her steadily as a ferry until the Armistice.'

From the aerodrome which had been established on the western side of Thasos Island, the lines of communication on the flank of the Bulgarian army on the Macedonian front were open to attack from the air. A Flight, therefore, made up of three Henri Farmans, one Nieuport, and two Bristol Scouts, was sent to Thasos at the end of May from No. 2 Wing at Imbros and was joined by a Flight of Nieuports and Maurice Farmans of the French air service. The composite unit at Thasos, called 'A' Flight, was placed under Royal Naval Air Service command. When, at the beginning of July, the French detachment was withdrawn to Salonika, the seaplane unit at Stavros, which had completed its photographic survey, was transferred to Thasos to reinforce 'A' Flight.¹ The main operations of

¹ For air patrols over the approaches to the Gulf of Salonika, an airship shed had been erected at Kassandra, and an S.S. airship had been sent to

this Flight during June and July were expeditions to southern Bulgaria to destroy ripening crops with incendiary bombs. Many fires were started and patches of crops were burnt, but it is doubtful whether the results obtained justified the use of aircraft for such a purpose.

In August 1916 the Bulgars advanced and took control of Macedonia east of the Struma,¹ and it became necessary to make changes in the disposition of the naval aircraft in the Eastern Mediterranean to give the maximum assistance to the ships protecting the British right flank at Chai Aghizi, and to the 80th Brigade operating on that front. As a result of the unsatisfactory conduct of the Greek army, Allied ships were again assembled in the neighbourhood of Athens, among them the aircraft carrier *Empress*, transferred from Port Laki. Air reconnaissances were made of the Greek fleet in the Piraeus and there were daily flights over Athens.² On the 12th of September the *Empress* was sent to Stavros to work with the British ships. Two seaplanes were transferred to the monitor *Sir Thomas Picton* and the cruiser *Endymion*, from which they made spotting flights, &c., direct. For work with the 80th Brigade, 'D' Flight was moved from Mudros to Stavros at the end of August. The arrival of 'D' Flight enabled the aircraft of 'A' Flight at Thasos to be used for more extended reconnaissance work over the Bulgarian lines of communication, and for bombing operations.

An important target was the railway bridge across the Mesta river at Buk. On the 15th of October 1916 a hit by a 100-lb. bomb destroyed the second span of the bridge, and subsequent air reconnaissances revealed that the enemy was transferring stores by wagon transport across a new trestle-bridge between trains on each side of the broken bridge. Attacks were thereupon made on other bridges on either side of Buk at points where alternative road transport was difficult or impossible, and, at the end of October, the bridge at Shimshirli, half-way between

this base in June. The first patrol by this ship was made on the 1st of July.

¹ See pp. 339-40.

² Relations with Greece were strained until the middle of December 1916, when the Greek Government acceded to the Allied demands.

Buk and Drama, collapsed into the river as a result of hits from 112-lb. bombs, and this important stretch of railway was put out of action until the middle of November. When repairs had been made, anti-aircraft guns were mounted and, although other bomb attacks were attempted, the accuracy of the gun-fire forced the pilots to fly too high for effective aiming.

The enemy assembled aeroplanes and seaplanes to counter the Royal Naval Air Service offensive. Aerodromes were established at Drama, Xanthe, and Maswakli, and a seaplane base at Gereviz on Lake Boru, thirty-five miles from Thasos. Many bombing attacks were made on the Thasos aerodrome, and in the autumn of 1916 the German fighters began to take toll of the Naval Air Service bombers. It was not long, however, before the seaplane base at Gereviz lost importance. Up to the end of November the base was continuously enlarged, but on the 29th of that month bombs from two Henri Farmans, dropped from heights of under 1,000 feet, started fires which were fanned by a strong wind and spread over the whole camp. The burning of the base was watched from Thasos, and later reconnaissances showed that Gereviz had been reduced to one hangar and a few bivouacs.

Seaplanes from the *Empress* and aeroplanes of 'D' Flight at Stavros were meanwhile working over the British right flank. On the 29th of September 1916 the fire of one of the ships was being directed on batteries at Dranli when the air observer saw about 4,000 men drawn up near the village. The ship's fire was at once diverted, and shells exploded among the enemy troops, who scattered to the hills, followed by the fire from the ship's guns. Bombing attacks on the aerodrome at Drama, and on camps and depots, were made by 'D' Flight from time to time, notably in November. On the 30th of this month bombs narrowly missed a train running into the station at Angista, whereupon the pilot descended within fifty feet from the ground and attacked the engine driver and fireman with his machine-gun: they jumped from the footplate, leaving the train to go on out of control.

While the operations off the Bulgarian coast were in

progress, 'C' Flight at Mudros, and 'B' Flight at Mitylene, were busy in the Dardanelles and in the Smyrna areas. On the 15th of April 1916 two pilots of 'C' Flight attacked Constantinople and, on the same day, a third pilot bombed Adrianople. Other targets were Gallipoli barracks on the Peninsula, Ferejik railway junction east of Dede Agach, and Smyrna railway station.

Towards the end of the year there was a marked increase in the enemy air activity. On the 21st of November an aeroplane and a seaplane attacked the airship shed at Mudros. The aeroplane pilot, after dropping one of his bombs within a few yards of the shed, escaped, but the seaplane was pursued and shot down by Flight Sub-Lieutenant A. F. Brandon in a Sopwith Schneider Cup seaplane: the destruction of the enemy seaplane was completed by ships' gun-fire.

On the 13th of December an attack by five aeroplanes from Imbros (four Henri Farmans and a Bristol Scout) was made on the railway bridge across the Maritsa river at Kuleli Burgas. One 100-lb. and nine 65-lb. bombs were dropped, and one of them hit an island supporting the centre of the bridge. The bridge was attacked again by moonlight on the 4th of January 1917, when three Henri Farmans dropped bombs from between 1,000 and 2,000 feet. Two 100-lb. bombs hit the bridge and three 65-lb. bombs exploded on the abutments. One of three 65-lb. bombs aimed at an iron road bridge, south of the railway bridge, exploded at its eastern end.

When Rumania came into the war in August 1916, the Germans, realizing the weakness of the Rumanian air service, sent No. 1 Battle Squadron to Bulgaria for a bombing offensive against Bucharest and other towns. Attacks were made by day and by night and Rumania was forced to appeal to the Allies for help. The Admiralty agreed to send an air detachment from the Eastern Mediterranean and, on the 25th of October, three Nieuport two-seaters and two Henri Farmans set out from Imbros on the 300 odd mile journey over the Balkan mountains to Bucharest. All pilots had to fight their way through a thunderstorm. One reached his destination

after a 6½-hour flight, and another, whose compass became useless, landed in Russia. The remaining three pilots landed near Bucharest and afterwards proceeded to their destination by road or by air. As a result of a further appeal for aircraft in November, the Admiralty decided to send a squadron of twenty 1½-strutter Sopwiths, and meanwhile, on the 21st, an additional three Nieuports and one Henri Farman were sent to Bucharest from Imbros: they arrived without incident.¹ By the end of November, however, the Germans had overrun Romania and were at the gates of Bucharest. The organization of a Sopwith squadron for service in Romania was therefore abandoned, and no further naval aircraft were sent from the Eastern Mediterranean. In addition to this small naval flying detachment, three armoured-car squadrons of the Royal Naval Air Service, which had been working on the Russian front, operated with the Romanian army, notably during the attack on the German and Bulgar positions in the neighbourhood of the Tchernavoda bridge from the 25th of November to the 3rd of December 1916.

Palestine, Asia Minor, and the Red Sea.
Seaplane Carriers

At the beginning of 1916, when reported Turkish troop movements in Palestine were causing some uneasiness in Egypt, the seaplane carrier *Ben-my-Chree* was transferred from the Eastern Mediterranean to Port Said for operations under the Commander-in-Chief, East Indies. Since December 1914 the task of air reconnaissance of the enemy movements on the sea flank in Sinai and Syria had been undertaken, as has already been told,² by a seaplane unit based at Port Said. This unit had the use of two former tramp steamers, the *Anne* and the *Raven II*, which had been fitted to carry two seaplanes each. Throughout 1915 the small seaplane unit at Port Said made many reconnaissance flights, particularly over the Sinai desert, during the Turkish attack on the Suez Canal in January 1915. The endurance of the seaplanes, however, did not

¹ Ground personnel and stores for this detachment were sent to Romania by way of Russia.

² Chapter III, p. 161 et seq.

permit of extended reconnaissances of southern Palestine, and aircraft of higher performances were asked for.

In January 1916 the seaplane carrier *Empress*, with two Short and four Sopwith Schneider Cup seaplanes, reinforced the Port Said base from England, and at the end of the month the *Ben-my-Chree*, *Empress*, *Anne*, and *Raven II*, and the air unit at Port Said, were grouped to form a single command under Squadron Commander C. J. L'Estrange Malone of the *Ben-my-Chree*.¹ The duties of this composite unit were diverse. They included overland reconnaissance of the approaches to Egypt through Syria and Sinai and bombing attacks on enemy centres along these routes, reconnaissance of the western desert, air patrol of the Syrian and Sinai coasts and of the Red Sea and the Gulf of Aqaba, and, finally, air operations to distant bases in the East Indies.

During the first three months of 1916 the main work of the seaplanes was reconnaissance of the Turkish dispositions in southern Palestine and Sinai to assist the Royal Flying Corps to watch for movements or concentrations which might threaten the Suez Canal.²

At the beginning of February the *Ben-my-Chree* was sent to the north coast of Africa in connexion with operations undertaken against the Senussi in the western desert. On the 11th of February air reconnaissances were made of Barrani and Sollum in preparation for an advance by the Western Frontier Force from Matruh.³ Early in March the carrier was back off the coast of Palestine and her seaplanes made reconnaissances of the Beersheba area.

In this month a demand for aircraft came from Aden, where the Protectorate was invested from the north by

¹ The French seaplane Flight was withdrawn in the middle of April. The *Empress*, about the same time, was temporarily transferred to Mudros for operations under the Vice-Admiral, Eastern Mediterranean. In May Wing Commander C. R. Samson succeeded Squadron Commander C. J. L'Estrange Malone.

² By arrangement between the naval and military commands, the seaplane carriers were placed at the disposal of the G.O.C., Egypt, as and when required.

³ See Chapter III, pp. 168-9.

a Turkish force which had advanced from the Yemen in July 1915, and had occupied Lahej, twenty miles north of Aden.¹ The British and Indian troops of the garrison were strong enough to hold the Turks to their positions so long as the local tribes did not rally to the side of the enemy. In the spring of 1916 it became known that tribal leaders had arrived at Lahej to confer with the Turkish commander, Ali Said Pasha. The Turkish force in the Yemen was separated from the main Turkish force in the north by the hostile Idrissi country and had, therefore, to rely almost entirely on local tribes for its supplies. The authorities at Aden considered that a show of force would impress the tribesmen and go a long way towards removing the threat to Aden. Owing to the great heat infantry action was undesirable and it was therefore decided that a surprise air attack should be made against the Turkish head-quarters and camps.

When the decision was reached, the *Ben-my-Gbree* was back at Port Said, refitting, and she therefore transferred one two-seater Short and five Sopwith Schneider Cup seaplanes to the *Raven II* which left for Aden. As surprise was aimed at, the *Raven II* stopped off Perim Island to erect her seaplanes, which were then stowed on deck, ready to fly, and she entered Aden harbour after dark on the 30th of March. At a conference between the Commander-in-Chief, East Indies, and the General Officer Commanding, Aden, at which Flight Commander C. H. K. Edmonds in command of the Flight was present, it was decided that a reconnaissance of the enemy camps should be made at dawn on the 1st of April and that the reconnaissance flight should be followed by a series of bombing attacks. This arrangement was duly followed and, in three days, 91 bombs of 20-lb. weight were dropped from low heights on the main Turkish camps near Subar, Waht, and Fiyush. Pamphlets, urging the Arabs to desert from the Turks, were also dropped. On the 3rd of April, the demonstration having been made according to plan, the *Raven II* left Aden to return to Port Said.

¹ See *Military Operations, Egypt and Palestine* (MacMunn and Falls), Vol. I, pp. 221-4.

Early in June 1916 further air operations over the Yemen were undertaken by the *Ben-my-Chree*. As the carrier approached Aden at dawn on the 7th of June, a Short seaplane was sent away to make a reconnaissance of the Lahej delta. The report of the air observer made it clear that the best objectives for the initial attacks were camps north of Lahej, and a camp and depot at Subar. Other camps and also trench and gun positions were subsequently noted and, during the next six days, bombing attacks were made twice daily, morning and evening. Forty-four bombs up to 112-lb. weight were dropped from heights under 1,000 feet. Petrol bombs dropped on the camp at Subar on the morning of the 12th caused a fire which was still seen to be burning when the *Ben-my-Chree* left for Perim Island in the late afternoon. The carrier was off Perim Island early on the 13th, and bombing attacks were begun on the camps at Jebel Malu and Jebel Akrabi. At the same time a wireless-fitted Sopwith spotted for the *Ben-my-Chree*'s guns against these objectives. From Perim Island the carrier sailed for Jidda to join a small naval force which was assisting the Sherif of Mecca in his revolt against the Turks.¹

The *Ben-my-Chree* returned from the Red Sea to Port Said, but at the beginning of July she went to the Syrian Coast to relieve the *Raven II*. The latter carrier then sailed for the Island of Kastelorizo for reconnaissance and bombing operations along the Levisi district of the coast of Asia Minor, where, it was suspected, U-boat refuelling bases existed. After reconnaissance and bombing in the neighbourhood of Beirut, and also of El Arish, the *Ben-my-Chree* went back to Port Said. She sailed again on the 25th of July, in company with the French destroyer *Arbalète*, to make reconnaissances of the Nazareth valley. On the way a look-out was kept for gun-running dhows which were known to be supplying the Turks. In particular, the carrier was asked to watch for a red-painted schooner—a suspected ammunition ship. As the *Ben-my-Chree* was steaming along the Syrian coast on the 25th three schooners came into view. The leader made off

¹ See pp. 219-20.

as soon as she sighted the carrier, but a seaplane was launched at once and the pilot succeeded in heading the two remaining schooners from the shore. One of them proved to be the red-painted vessel, and by feint attacks the seaplane pilot was able to shepherd her towards the *Ben-my-Chree* which, in co-operation with the *Arbalète*, destroyed her. The explosion, when the schooner blew up, left no doubt about the nature of her cargo.

Next day, the 26th of July, an air reconnaissance of the Nazareth valley from Haifa to Affule, an important junction on the Aleppo-Beersheba railway, revealed that a large camp and dump were being established at the railway junction. This discovery led to a plan for a bombing attack which was made in the following month. Meanwhile the *Ben-my-Chree* went into dock and the main air work fell to the *Raven II*, which was sent into the Red Sea to make a photographic survey of the country at the head of the Gulf of Aqaba, and along the east coast of the Red Sea as far as Mowilah and Wejh. This task finished, she returned to the Syrian coast.

On the 10th of August, during the retreat of the Turkish forces after their attack on Romani,¹ two of the seaplanes from the *Raven II* made spotting flights for the monitor *M.21* in connexion with a bombardment of a Turkish camp near Bir el Mazar on the coast road in Sinai. The first seaplane dropped four 20-lb. bombs on the camp to indicate its position to the monitor, but soon after fire had been opened the second seaplane, from which the observer was sending fire corrections, was attacked by an enemy aeroplane and forced down on the water. It was taken in tow by the monitor and eventually hoisted back on board the *Raven II*. Enemy aeroplanes then appeared and bombed the carrier, but made no hits.

On the 14th of August the *Ben-my-Chree* was out of dock and she sailed with a French destroyer escort to make an extended reconnaissance of the lines of communication behind the Turkish Sinai forces. One hundred and sixty-five miles of coast line to a depth of twenty miles were

¹ See Chapter III, p. 194.

examined by the carrier's seaplanes, and the more important centres were photographed. As a result of the information gained, a series of air attacks was planned to take place from the 25th to the 29th of August.

The first objective was the dump at Affule which had been discovered in the previous month, and the *Ben-my-Chree*, *Raven II*, and *Anne* assembled at Haifa at dawn on the 25th of August. Ten seaplanes flew off, and when they reached Affule the pilots found that the camp had been greatly enlarged and that the anti-aircraft defences had been strengthened. For about half an hour the attack was made methodically on the camp, dump, and railway, and stores and carriages were set on fire. One train, which steamed out of the station, was found by the *Raven's* seaplanes which had been allotted the task of bombing the railway line. The rear coach of the train was shattered by a direct hit from a bomb, while other bombs destroyed the permanent way.

All the seaplanes returned safely to the carriers, and when they had been hoisted in, the three ships and their escort went south down the coast. On their way they encountered two dhows, one of which was destroyed by gunfire from the *Arbalète*, while the other was captured and taken in tow by the *Ben-my-Chree*. Prisoners from this dhow confirmed that the two vessels were used for revictualling the Sinai troops. About midday, seven seaplanes were sent away to bomb the camp at Bureir and the railway viaduct over the Wadi el Hesi. The camp was hit and damaged and camels were stampeded by Lewis gun fire, but the viaduct was not destroyed, the nearest bombs exploding on the embankment and on the permanent way by the bridge. One of the pilots, Flight Commander G. B. Dacre, failed to return and was taken prisoner by the Arabs. On the night of the 25th of August the three ships separated. The *Ben-my-Chree* went north to Tripoli on the Syrian coast, and next morning one of her Shorts, carrying an observer, made a photographic reconnaissance to Homs, forty-five miles inland beyond the cloud-topped Lebanon hills, 1,800 feet high. On the 29th the carrier was in Alexandretta Bay whence bombing attacks were made on

the railway station at Adana and on the bridge over the river Jeihan.

Meanwhile the *Anne* had gone to Nahr Iskanderune, north of Jaffa, and on the 26th one of her seaplanes attacked the station at Tul Karm while the second bombed a camp north-west of Er Ramle. The *Raven II*, after parting company from the other ships, had gone to Asia Minor and on the 27th, from the Gulf of Adalia, her two seaplanes bombed a factory near Fineka.

The *Ben-my-Chree*'s attack on Adana ended the special operations, during which places had been reconnoitred and bombed from Adalia in Asia Minor to Bureir in southern Palestine.

The *Raven II* was back in Port Said on the 1st of September, making ready for an expedition into the Red Sea in support of the Sherif of Mecca, when a bomb from an enemy aeroplane struck the ship, causing nine casualties. The carrier had to remain behind for repairs, and her place in the Red Sea was taken by the *Anne*.

Enemy aircraft struck another blow about a fortnight later. On the morning of the 17th of September the *Ben-my-Chree* was off the coast near El Arish in company with the *Espiègle* and the monitors *M.15* and *M.31*. Her orders were to send one Short and two Sopwiths to spot for the fire of the *Espiègle* on suitable targets found on the road from El Arish to Bir el Mazar, and another Short, similarly escorted, to direct the fire of the monitors on the camp and aerodrome at El Arish. Soon after the seaplanes arrived over their objectives, enemy aeroplanes appeared. Some of them attacked the ships, unsuccessfully, with bombs, and one, a fast single-seater fighter, shot down two of the escorting Sopwiths. One of these was destroyed in flames, but the other landed on the water and was salvaged by a trawler. A third Sopwith, which landed on the sea through engine trouble, was lost, but the pilot was rescued.

In November the *Ben-my-Chree* went to the Gulf of Adalia, where spotting flights were made to range the guns of a small French naval detachment on Turkish shore trenches and gun positions. Towards the end of December

the carrier was given a more important task. On either side of Karatash Burnu, in the Gulf of Alexandretta, rivers flow into the sea. They are the Jeihan and the Seihan, and across these two rivers, inland of the coast, long girder bridges carried the single line of railway by which the Turkish armies in the east were supplied. It was not, however, until 1918 that through railway communication from Constantinople was completed. In 1916 troops and supplies had to be detrained at Bozanti and then sent forward by road to Tarsus, where they were again entrained for Alexandretta. From this port they were moved by road to Aleppo, where they finally took to the railway, southwards for Palestine or eastwards for Mesopotamia.¹ The bridges across the Jeihan and Seihan were on the important stretch of line between Tarsus and Alexandretta. They were within striking distance of seaplanes hoisted from carriers, but although arrangements were made to attack the bridges there was no attempt to concentrate sufficient bombers to ensure destruction, a feat probably within the capabilities of the contemporary aircraft, more especially as the Turkish anti-aircraft defences in the neighbourhood were negligible. On the other hand, there was little point in diverting resources to destroy the bridges if the cutting of communications was not closely co-ordinated with military operations. The effect could be no more than temporary, and of military importance, therefore, only if the delay in the passage of troops and supplies occurred at a time when delay was vital in connexion with army operations.

Such forces as were used came near to achieving their object. The *Ben-my-Chree* and the *Raven II* were off Karatash Burnu on the morning of December 27th. The target chosen for the attack was the Chikaldir bridge over the Jeihan. One Short and three Sopwiths from the *Ben-my-Chree* made the first attack from under 700 feet. In the second attack two Shorts from the *Raven* dropped one 65-lb. and eight 16-lb. bombs and, in the third, one Short and two Sopwiths from the *Ben-my-Chree* dropped

¹ See *Military Operations, Egypt and Palestine* (MacMunn and Falls), Vol. I, p. 21 et seq.

six 65-lb. bombs. Two light-weight bombs and two of 65-lb. weight hit the bridge, but they were not destructive enough and the damage inflicted was insufficient to stop normal traffic, although it was known afterwards that the passage of heavy guns for Baghdad was delayed.¹

1917—March 1918

The Adriatic. Anti-submarine Measures

The Mediterranean proved almost ideal for the operation of enemy submarines. German U-boat commanders found that navigation in its waters was simple, that some of the lonely islands in the Aegean offered pleasant concealment when necessary, and that the geographical formation of the inland sea made evasion extremely difficult for Allied shipping. The U-boats lurked, a menace of increasing importance, in the path of the supply and troop movements upon which the campaigns in Egypt and Palestine, in Macedonia, and to some extent in Mesopotamia, depended. The ports from which most of the U-boats began their operations were in the Adriatic. At Cattaro was the base from which the majority of the submarines worked, and at Pola were the dockyards in which the U-boats were refitted and repaired. From the Allied point of view it was desirable, no matter how great the difficulties might be, to make the departure of submarines from, and their entry to, the Adriatic as dangerous as possible. Common sense, as well as the British

¹ It appears that the attack had been sanctioned as a suitable operation for a period of quiet air activity. In notifying their approval General Headquarters staff in Egypt had said: 'Adana Bridge appears to offer an objective which might with advantage be attacked at any moment, as damage to this bridge, with its constant military traffic, would almost certainly produce serious dislocation in the enemy's transport arrangements, and, further, would probably take considerable time to repair.'

It is of interest that the question of cutting the Turkish communications in the Adana section was considered by the Air Staff early in 1918 and also by the Air Policy Committee of the War Cabinet. The decision was that the resources available precluded an allotment of aircraft necessary to cut the communications, and to keep them cut. There were many other targets suitable for air attack which offered a prospect of more effective military results.

doctrine of naval warfare, demanded also that the submarines should be attacked at their bases, and that those bases should be damaged as much as possible. It may sound axiomatic that, in war time, offensive action is essential, but the state of mind which U-boat attacks tended to engender must be remembered. Merchant ships, on which the whole existence of the Allies depended, were being destroyed daily at a rate which, in the spring of 1917, had become alarming. It was not unnatural that the inclination should exist to surround merchant vessels with every available safeguard, and that the argument should be put forward that it was undesirable to dissipate the small forces, suitable for protective duties, on offensive measures which might produce no immediate or definite success.

In May 1915 Italy had declared war on Austria, and in the same month a British squadron of old battleships and light cruisers had, under Rear-Admiral C. F. Thursby, joined the Italian fleet at Taranto to work in the Adriatic under the Italian naval Commander-in-Chief. In September 1915, with the object of impeding the passage of U-boats through the Otranto Straits, a barrage of indicator nets, operated by British drifters with a covering force of French submarines and French and Italian surface craft, had been initiated. In the spring and summer of 1916 the Austrian submarine *U.6* and the German *U.B.44* had been trapped in the drifter nets and destroyed, and it was believed that other Austrian submarines, similarly caught, had also been accounted for. But in the latter part of 1916 the U-boat commanders had betrayed cautiousness in which they were helped by the considerable depth of the water in the Otranto Straits, and it soon became obvious that they no longer found the net barrage an obstacle.

Meanwhile, in May 1916, Rear-Admiral Mark E. F. Kerr, who had a lively appreciation of the value of air power, had taken over the command of the British Adriatic Squadron, and it was not long before he asked for aircraft for three purposes, namely, (i) patrol of the drifter line in the Straits of Otranto so as to force the U-boats

to keep under water and go blind through the nets; (ii) for bombing attacks on that part of the dockyard at Pola where submarines transported overland from Germany were assembled, and on the submarines lying in the harbour at Cattaro; and (iii) for bombing attacks on a factory at Fiume at which torpedoes were being made. The Adriatic, however, was primarily an Italian responsibility and after that a French one, and Rear-Admiral Mark Kerr was informed, in answer to his requests (and similar subsequent ones), that no British aircraft could be made available for the Adriatic for a long time, and he was told to raise the matter with the Italians and with the French. This he did, at intervals, but without success.¹

In October 1916 Rear-Admiral Mark Kerr asked for a kite-balloon ship as he was anxious to use balloons on the drifter line, and in ships engaged on anti-submarine patrol. When this request was considered at the Admiralty it was stated that seaplanes would be of more use to the drifter patrol than kite balloons because the latter could only observe and could not attack, but there was still the difficulty that aircraft and, particularly, trained personnel, could ill be spared. There was, however, a small naval air station at Gibraltar which had been established after the passage of *Hersing* through the Straits in the *U.21* in May 1915. Apart from the fact that Gibraltar had become of decreasing importance as an area for U-boat activity, experience had shown that submarines could pass through the swift-running waters of the Straits of Gibraltar with little fear of detection from the air. In consequence, the Admiralty decided that the air personnel at Gibraltar might be employed to open a base at Otranto and, by the

¹ The insistent note for attack, running through Rear-Admiral Mark Kerr's communications, may be illustrated by an extract from a letter to Mr. Balfour, the First Lord, on the 23rd of June 1916. Referring to his representations to the Italians, he said: 'I also pointed out that the loss of transport was very serious to the Allies and that the principal place where we were all being bled was in the Mediterranean, and all the submarines worked from Cattaro, had their torpedoes made at Fiume, and were constructed and had large repairs done at Pola. Consequently if we destroyed the Base and both factories we would cut the root of the matter. This can only be done by air. . . .'

end of 1916, the naval air detachment at Gibraltar had been withdrawn to Malta preparatory to the formation of the new Otranto air station.

A little time before this a situation of some delicacy had arisen in the Adriatic. That the Allied measures to counter the U-boat threat in that area were ineffective was recognized, but the French and Italians could not come to an agreement about reorganization and command. Eventually in November 1916 it was decided that a British naval officer should take charge of the barrage, under the direct orders of the Italian naval Commander-in-Chief, and the appointment was given to Commodore A. W. Heneage. This extension of British control in the Otranto Straits area made the question of the provision of aircraft one of immediate concern to the Admiralty. 'The inefficiency of this barrage', wrote the Chief of the Staff at the Admiralty in December 1916, 'is the root of 'all the submarine trouble in the Mediterranean', and he proceeded to lay stress upon the need for effective air patrol of the barrage line. Although steps had already been taken to initiate a small base at Otranto by transferring the naval air detachment from Gibraltar, this would not go much of the way to solve the problem, and because the calls for aircraft for anti-submarine work were many and urgent, the First Sea Lord (Admiral Jellicoe) was asked to give a definite ruling on the relative importance of the different areas of U-boat activity in order that the naval aircraft resources might be apportioned accordingly. Admiral Jellicoe defined the order of importance as (i) the English Channel, (ii) Otranto, and (iii) Malta and Gibraltar. It was therefore decided to open the air base at Otranto as soon as possible and Wing Commander R. Gordon was sent to the Adriatic to confer with Rear-Admiral Mark Kerr. As a result of their conference the site for a seaplane base was taken over, and at the end of January 1917 orders were given for the transfer to Otranto of six 225 horse-power Shorts from the Dundee air station. Arrangements were also made for the dispatch of four additional 150 horse-power Shorts as soon as they were delivered from the makers.

Meanwhile, in December 1916, Commodore Murray F. Sueter, who had long advocated the value of torpedo-carrying aircraft, had submitted a paper to the Board of Admiralty in which he outlined proposals for attacks, by torpedo-carrying seaplanes, on the German fleet at Wilhelmshaven and on the Austrian fleet at Pola. The First Sea Lord, who favoured the idea, thought that the chances of success in the immediate future were more likely in the Adriatic than on the North German coast, but that the operation would call for a responsible officer who believed in, and was enthusiastic for, this form of attack, and he proposed therefore that the command should be given to Commodore Sueter. This proposal was approved by the Admiralty at the end of January 1917, and at the same time orders were given to the manufacturers for twenty-five 18-in. torpedo-carrying seaplanes. Meanwhile the immediate dispatch of eight 14-in. torpedo-carrying seaplanes to the Mediterranean was sanctioned.

The establishment laid down for the Otranto base in February 1917 was six two-seater and six 'Baby' seaplanes for barrage-work, twelve 310 horse-power Shorts for torpedo attacks on the Austrian fleet or for bombing attacks on naval targets, and six two-seater aeroplanes to provide escorts for the torpedo seaplanes. A torpedo school at Malta was to be equipped with four 240 horse-power and two 310 horse-power Short seaplanes. Before the end of April the personnel and the greater part of the stores had arrived. A base for the housing of stores and for the erection of the seaplanes was opened at Taranto, and slipways were built at Poveglia Island in the Venice Lagoon from which the seaplanes could, when the time came, start on their torpedo or bombing attacks on the Austrian bases at Pola and Fiume. The naval air units in southern Italy were, at the same time, reorganized into two squadrons and one Flight to form what became known as No. 6 Wing with head-quarters at Otranto. A direction-finding station and two other wireless stations were erected by the Royal Naval Air Service, and a special look-out post, manned by air service personnel, was established at Cape Palascia, south of Otranto.

Meanwhile, at a conference held in May between the Italian, French, and British air service officers in the Adriatic, under the presidency of the Italian vice-admiral, the organization of the Allied aircraft patrols in the lower Adriatic, and in the Ionian Sea, was decided upon. Patrol zones were allotted to the three Allied air services. Those for which No. 6 Wing was to be responsible were: (i) by seaplanes, eight miles north of, and parallel with, the drifter line, (ii) by seaplanes, ten miles north of proposed northern hydrophone line¹ with the object of compelling U-boats to dive, and (iii) by aeroplanes, along the western side of the Otranto Straits and to the southward of Cape Sta. Maria di Leuca, to prevent U-boats making a landfall.

The patrols from Otranto began in June 1917. Sopwith 1½-strutter aeroplanes, which could get away quickly, were used chiefly as stand-by aircraft to be sent up immediately news came of the sighting of a U-boat. The U-boat commanders, however, increased their caution, and no submarine was attacked by the naval aircraft until the 8th of August, when seaplanes found a U-boat previously reported by the look-out station. She dived before the seaplanes could get into position for effective attack, but she was reported to the French aircraft base at Corfu, and when the U-boat came up later she was found by French pilots who claimed that they destroyed her with bombs.

The first attempt to use the torpedo-carrying Short seaplanes was made on the 2nd of September. Six Shorts were towed on 'skids' by motor launches to a rendezvous fifty miles south of Traste Bay, whence they were to leave, with a covering force of Allied light cruisers and destroyers, for an attack on submarines lying off Cattaro.² The seaplanes were towed on 'skids' part of the way because they could not lift sufficient petrol to reach their objective if they flew from their base direct. The weather reports had

¹ This line was to be established eight miles north of Otranto to Saseno Island or to Cape Linguetta.

² Rear-Admiral Mark Kerr's orders gave '*1st Objective*. Submarines lying in Straits of Kumbor. *2nd Objective*. (If 1st not possible or no submarines are found). Any ships found in Teodo Bay, preferably light cruisers or destroyers.'

indicated that the conditions would be favourable, but at 4 a.m., when the Shorts were ready to take off, the wind increased almost to gale force and heavy seas were running. Two pilots tried unsuccessfully to get off the water and the enterprise was then, perforce, abandoned. On the journey back to Otranto the seaplanes were buffeted by the choppy seas: one became waterlogged and sank, and the others were damaged.

Commodore Sueter was not daunted by this disappointment. In his report of the operation he asked for an increase in the number of torpedo or bombing seaplanes, and he followed this, on the 20th of September, with a memorandum in which he surveyed the existing strengths of the Allied air units, and outlined his future requirements for the Royal Naval Air Service. These were based on the opinion that a more vigorous offensive against the Austrian bases was essential, especially in view of the vulnerability to aircraft attack of the railway down the east coast of Italy by which a new line of communications to Egypt and Salonika had been established through the port of Taranto. An increase of U-boat activity against Allied transports using Taranto was also to be expected. Commodore Sueter believed that Allied aircraft operations, sustained and properly co-ordinated, might make the Adriatic ports untenable as submarine bases, and would certainly make it difficult or even impossible for U-boats to work in the Adriatic. For the barrage, he would require 65 patrolling, bombing, and fighting aircraft, and for the offensive against Pola and Fiume, 30 to 50 bombers, and 25 fighters. The Admiralty, on consideration of this memorandum, sanctioned an increase of the establishment at Otranto and Taranto to 80 seaplanes and aeroplanes, but some time elapsed before any definite action was ordered.

The Appointment of a British Commander-in-Chief

By this time steps had been taken to co-ordinate the efforts of the various British naval squadrons in the Mediterranean. The appointment of a British Commander-in-Chief, Mediterranean, had lapsed on the

outbreak of war when the French had taken over general responsibility. Although the main strategical question, namely, the destruction of the enemy fleet should it put to sea, had thereafter been provided for by the presence of the French Commander-in-Chief, in command of his battle fleet, the Mediterranean had become the scene of many disconnected campaigns, each under its own flag officer. The need for centralizing Allied direction had not been fully realized until after the opening of unrestricted U-boat warfare in February 1917. It had soon become apparent that the arrangement must end by which separate British squadrons, in different areas of the Mediterranean, conducted independent operations with no British Commander-in-Chief to redispense squadrons and ships in order that the best use might be made of the total resources.

In April 1917 an important conference of Allied admirals was held at Corfu. It was then decided that anti-submarine patrols should be abolished, except at focal points, and that all shipping must sail escorted, preferably in small convoys. It was recognized by the Allied delegates that the appointment of a Flag Officer, to take charge of all questions affecting the allotment of routes and the protection of shipping in the whole Mediterranean area, was necessary. It was ultimately agreed that this officer should be British and this decision involved, in effect, the reintroduction of a British Commander-in-Chief, Mediterranean. The appointment, which was made in August 1917, was given to Vice-Admiral the Hon. Sir Somerset A. Gough-Calthorpe, whose head-quarters were opened at Malta. So that there should be no doubt about the supremacy of the French Commander-in-Chief in the conduct of operations, it was decreed by the Admiralty that the British Commander-in-Chief should fly his flag ashore. Meanwhile, arising out of this reorganization, Egypt had been separated from the East Indies command. Rear-Admiral Ernest F. A. Gaunt had relieved Vice-Admiral Sir Rosslyn E. Wemyss as Commander-in-Chief, East Indies, on the 21st of July, and next day Rear-Admiral Thomas Jackson had taken

over as Senior Naval Officer, Egypt, his command including the Red Sea as far as Bab el Mandeb.

Although it was the depredations of the German U-boats which brought back a British Commander-in-Chief to Malta, the advantages which followed that appointment extended to every naval activity in the Mediterranean. Vice-Admiral Sir S. A. Gough-Calthorpe exercised supervision and control over the squadrons and bases commanded by the rear-admirals and commodores in the Aegean, in Egypt, in the Adriatic, at Gibraltar, and at Malta.

On the 9th of October 1917 Vice-Admiral Gough-Calthorpe, in a memorandum to the Admiralty, pointed out the urgency of the need for an increase in the aircraft at Otranto. 'Aircraft', he said, 'are among the most important, if not the most important, weapons of offence that can be used against enemy submarines in the Adriatic. It should be possible, if not to prevent enemy submarines from using Adriatic bases, at any rate to make their passage to and from the Mediterranean such a risky proceeding as to constitute a serious deterrent to them. Very great opportunities are afforded for the work of aircraft, and their use should be developed with the least possible delay so that there may be a constant air patrol of the whole Straits of Otranto, instead of the present spasmodic patrol, and that the bomb attacks on Cattaro and Pola may be continued relentlessly and regularly. . . . I hope also to strengthen and improve with all the means at my command the barrage of the Straits by surface craft. These operations must be regarded as the first and most important duties of the Naval forces in the Mediterranean, and if it is necessary, other squadrons or areas in my command will be called on to provide additional personnel and material. . . . I am of opinion that the machines already asked for by Commodore Sueter . . . should be provided. Further, that for the present, only sufficient material and personnel necessary to keep the existing establishment complete should be sent to other parts of the Mediterranean. If this procedure is not adopted, then, instead of a strong

'concentration at the place which offers the best strategical conditions, a large amount of effort, energy and fighting power will continue to be expended in a dispersion which can give no decisive results.'

The Vice-Admiral supported his arguments with a summary of the work done by Allied aircraft in the Straits of Otranto. 'It is remarkable', he said, 'how many submarines were hunted and attacked in view of the small number of machines available for flying.' His list showed that between the end of May and the 17th of September 1917 aircraft were in action against U-boats on thirteen occasions. In addition to the U-boat already referred to as destroyed by the French air station at Corfu on the 7th of August, another was shown as seriously damaged or destroyed by a Sopwith from Otranto on the 17th of September. On this occasion the U-boat was attacked twenty-five miles off Otranto with a 65-lb. delay-action bomb which was dropped just ahead of the submarine a few seconds after she had dived. A large oil patch came to the surface and although a hydrophone patrol was kept up for eight hours nothing more of the submarine was heard or seen.

The Commander-in-Chief, having received no reply from the Admiralty to his letter, wired on the 15th of December: 'I request I may be informed what action has been decided upon. At the end of November Commodore Sueter reported that only six machines were ready for flying. This in view of the number of targets presented by enemy's submarines in the Straits of Otranto recently is lamentable. I request that the situation as regards aircraft in the Mediterranean may receive the earnest consideration of the Board.'

The Admiralty reply had been sent off two days before. In this the Board expressed their general agreement with the Vice-Admiral's views, and stated that many seaplanes and fighting aeroplanes were on the way to Otranto, and that the whole question could be discussed with Wing Commander A. M. Longmore who had already left England for Malta. The Board stated that the Vice-Admiral should make such dispositions as he saw fit of the

air forces under his command and pointed out that the Eastern Mediterranean Squadron had over one hundred aeroplanes in service, in transit, or allocated, and that some of these might be diverted to Otranto at the Vice-Admiral's discretion.

In the result, a general scheme for the reorganization and expansion of the air units in the Mediterranean was drawn up, and it received Admiralty approval in February 1918. The post of Senior Air Service Officer on the staff of the Commander-in-Chief was created and the appointment given to Wing Captain A. M. Longmore. The Mediterranean was divided into several areas (Malta, Italian, Aegean, Port Said, and, later, Gibraltar), each of which was to be self-contained for aircraft, personnel, and repairs. Wing Captain Longmore was, under the Vice-Admiral, to have executive authority over all the areas, with power to move air units as required. Under the scheme Malta took on a new importance. The main aircraft spares and stores were to be kept there, and all aircraft arriving by sea were to be allocated to Malta for distribution by the senior air service officer. Four more carriers would be required to assist in the distribution of aircraft, stores, and personnel from Malta, and to form, in addition, mobile bases for air operations against U-boats in areas outside the range of shore stations. In the Italian area, there was to be established at Taranto a new aerodrome for the accommodation of a mobile bombing wing (twenty-three bombers and twelve fighters) for an air offensive against the U-boat base at Cattaro, and also a seaplane station to house nine large flying-boats for patrols along the barrage-line. The establishment laid down for Otranto was twelve two-seater seaplanes (260 horse-power Shorts), twelve light-bomber or reconnaissance aeroplanes (D.H.4's), and twelve fighter aeroplanes (Sopwith 'Camels'). In addition, for the two stations, Taranto was to maintain a reserve of three flying-boats, three aeroplanes, and thirteen bomber or fighter aeroplanes. By the end of March 1918 the majority of these aircraft had arrived or were on their way, and the British air activities in the Adriatic were widely extended.

MALTA

Anti-submarine patrols by small 'America' flying boats from Malta had been begun towards the end of 1916. They had been continued throughout 1917, mostly by Short seaplanes and by flying boats purchased from the Italians. A number of U-boats had been sighted and attacked, and although none had been destroyed, the air patrols, because they helped to restrict the freedom of movement of the submarines, and because they were able to give warnings to shipping, had been of value.

When it became clear, in the spring of 1917, that all the available large flying-boats, eminently suitable for anti-submarine work in the Mediterranean, would be appropriated by the home stations, arrangements were made to build flying boats in the dockyard at Malta. The first was completed in November 1917, and by the time of the Armistice seventeen more had been constructed.

Kite Balloons

Impressed by the proved value of kite balloons for escort duty with convoys in home waters, the Commander-in-Chief, Mediterranean, had asked in August 1917 for balloons for similar work in the Mediterranean, where the conditions were particularly favourable for this type of air observation. He suggested that sheds should be built at important ports of call from which balloons might be embarked in destroyers and sloops engaged on convoy escort duties. He proposed Malta as the first base, and in December 1917 sheds were erected at Sliema and gas-making plants laid down. In the same month a site for a balloon station was chosen at Brindisi, and another at Alexandria. Men and material were sent to these bases and, during the next few months, to Gibraltar, Bizerta, and Corfu, but none of the stations had begun work by the end of March 1918.

THE EASTERN MEDITERRANEAN, 1917

The air operations in the Aegean during 1917 may be divided into: (i) watching the Dardanelles for possible

movements of the Turko-German fleet, (ii) preventing enemy aircraft from surveying the British fleet bases and the movements of ships, (iii) long-distance reconnaissance to the Marmara and Bosphorus, (iv) bombing attacks on military objectives in Turkey and Bulgaria, (v) work on the right flank of the army in Macedonia, and (vi) anti-submarine patrols. For these extensive operations there was, in the Eastern Mediterranean on the 1st of February 1917, a total strength of 57 flying officers, 78 aeroplanes, 29 seaplanes, and 5 S.S. type airships. This strength was distributed among the following units: 'A' Squadron¹ at Thasos and 'D' Squadron at Stavros, responsible for reconnaissance and bombing operations in southern Bulgaria and the Lower Struma; 'C' Squadron at Imbros for reconnaissance and bombing of the Gallipoli Peninsula, the Dardanelles, the Sea of Marmara, and the Constantinople railway; and 'B' Squadron at Thermi (Mitylene) for anti-submarine patrols of the Smyrna and Aivalik areas, and for reconnaissance and bombing of the Panderma-Smyrna railway and other communications. The rest of the air command comprised the stores depot and base at Mudros, the S.S. airship station at Kassandra, the seaplane carrier *Empress*, and the depot ship *Ark Royal*.

Two additional squadrons were formed early in the year. At the end of February 1917, when the German mobile bombing unit made its appearance on the Dojran front in Macedonia, the assistance of the Royal Naval Air Service was sought. The admiral commanding the Eastern Mediterranean agreed to make up a mobile fighting squadron, and a bombing squadron, by taking aeroplanes and personnel from the existing squadrons in the Eastern Mediterranean.² A unit (called 'E' Squadron) equipped with four Sopwith 1½ strutters, and with one Sopwith Triplane, was formed in March and sent to an aerodrome at Hadzi Junas, behind the Dojran front, where it combined, temporarily, with a Royal Flying

¹ On the 1st of January 1917 the naval Flights in the Mediterranean had been renamed squadrons.

² 'C' Squadron at Mudros and 'B' Squadron at Mitylene were reduced to half-strength.

Corps detachment to form a unit known as the Composite Fighting Squadron. 'F' Squadron, made up of Sopwith bombers and fighters, was formed in April 1917, and operated first from an aerodrome at Amberkoj, behind the Dojran front, and later from Marian on the Struma front for bombing operations in the Upper Struma.¹

Meanwhile the bombing offensive by 'A' Squadron at Thasos was being maintained against the Bulgarian communications in Macedonia, particularly against the bridges, railheads, and dumps on the Xanthe-Drama line. When, towards the end of March 1917, it became known that large military bakeries and stores had been set up at Pravi, a series of bombing attacks were made which resulted in some direct hits and the burning out of part of the buildings.

Early in May prisoners reported that submarines were being assembled, under the supervision of German experts, in the Customs House buildings at Kavalla. Subsequent air reconnaissances disclosed great activity in the port, and to these indications was added the significance of new mine-fields, as well as reports of additional heavy guns on the coast. The Vice-Admiral thereupon ordered a bombardment of Kavalla to take place on the 20th of May, in which all the Royal Naval Air Service units in the area were to co-operate. Preliminary photographic reconnaissances of Kavalla and of its forts were made, and the waters near the port were closely surveyed for mines.

'A' Squadron at Thasos, reinforced by three seaplanes from Mudros, was given the task of directing the fire of the monitors *M.29* and *M.33* on the Customs House, Post Office, and lighters, and of the *Raglan* on any enemy guns which opened fire on the bombarding ships. Aircraft patrols in search of U-boats and mines were also to be maintained while the bombardment was in progress. The first aeroplanes left at 4.10 a.m. to take up the spotting. The monitors were quickly ranged on their targets, and it was not long before the Customs House, the Post Office, and a barracks were on fire. The Henri

¹ See also pp. 349-50.

Farman scheduled to co-operate with the *Raglan* was shot down near Kavalla and its two occupants were thrown out and killed.¹ The relieving aircraft, a Short seaplane, took over the spotting for the monitors soon after 6 a.m. and a Nieuport arrived at the same time and patrolled in readiness to direct the *Raglan* on active enemy guns. These, however, showed no disposition to interfere, and the possible reason was the presence over them of five bombers and three escorts of 'E' and 'F' Squadrons which had flown down from Marian specially for this operation. An early bomb made a hit on an occupied gun emplacement, and other bombs, dropped at any sign of activity, induced the gun crews to keep under cover. Air photographs taken next day revealed considerable damage to the Customs House and to other buildings in its vicinity.

The time was now approaching when the growing crops in enemy territory would be ripe enough for burning, and the squadron at Thasos was temporarily reinforced on the 6th of June by 'F' Squadron.² The attacks had begun on the 3rd of June, and they were continued to the 17th, when 'F' Squadron was withdrawn to Mudros for work elsewhere. During this time the smoke from the burning crops was often visible from Thasos, and when the attacks ended only isolated patches of crops were left standing in the area of Sarishaban and in the fertile valley of the Mesta river.

During all this time 'D' Squadron at Stavros worked in co-operation with the naval detachment operating on the British right flank and with the 80th Brigade in the Lower Struma. In addition to reconnaissance and photographic duties, the squadron made bombing attacks from time to time on enemy camps and dumps, and also sent up patrols to engage enemy pilots who attempted to reconnoitre the British positions.

¹ The Henri Farman was shot down by Leutnant von Eschwege: see *War Flying in Macedonia*, by Haupt Heydemarck, pp. 68-73.

² After the explosion on the aerodrome at Marian, when eight aeroplanes, &c., were destroyed, 'E' and 'F' Squadrons were merged into a new 'F' Squadron which was re-equipped at Mudros and sent to Thasos on the 6th of June.

At the end of July, owing to a shortage of aircraft, the squadrons at Thasos and Stavros were reorganized. All reconnaissance and spotting aircraft were concentrated at Stavros, and Thasos was left with a seaplane station, chiefly for the duties of anti-submarine and mine-field patrol. The aerodrome at Thasos was given over temporarily to a Greek bombing squadron ('Z' Squadron¹), but Thasos remained available as an advanced base, when necessary, for Royal Naval Air Service aeroplanes.

Early in August four bombing attacks were made by moonlight on the air base at Thasos, and the bomb and petrol dumps were set on fire. While the attacks were being made, the Greek pilots from Thasos were actually away bombing the enemy aerodrome at Drama, and they later retaliated for the raid on Thasos by bombing the enemy air base at Gereviz which was in process of being enlarged. Offers of assistance were also made by the Royal Flying Corps at Salonika, and as a result a series of combined attacks by the Royal Flying Corps, the Royal Naval Air Service, and by the Greek bombing squadron, were planned against Drama aerodrome and Gereviz. The raids took place on the 9th and 11th of August, the Royal Flying Corps taking part in the attacks on the latter day;² at Gereviz a hangar used as a petrol or bomb store was set on fire and burnt out, and a seaplane shed was hit. When the Royal Flying Corps aeroplanes returned from Thasos to the mainland, three fighter 'Baby' seaplanes and two naval 'Camel' aeroplanes were sent to Thasos, and they sufficed to frustrate retaliatory bombing which, for some days after the attacks on Gereviz, the enemy attempted. Towards the end of 1917 an increase of U-boat activity in the northern Aegean necessitated the diversion of aircraft to extensive anti-submarine patrols, and as, owing to a lack of reinforcements, the strength of the air units at Thasos had dwindled, offensive operations had to be curtailed.

¹ Greek naval and military officers for this squadron were trained by the Royal Naval Air Service at Mudros. The first of them had arrived at Thasos, after qualification, in March 1917.

² See also p. 357.

'C' Squadron at Imbros

Air reconnaissances of the Dardanelles and of the Gallipoli Peninsula were a daily routine of the Imbros squadron, which had also to supply aircraft for anti-submarine patrols and for intermittent bombing. In April 1917 shipping in Kephalo harbour and Aliko Bay, Imbros, was shelled by an enemy gun, the position of which was located from the air on the Peninsula. In the morning and afternoon of the 17th of May, the fire of the *Raglan* and of three small monitors was ranged by aircraft and the gun was silenced. Occasional shelling of Imbros, however, with the help of spotting aircraft, continued, but the enemy pilots were not allowed to remain long enough to permit of accurate ranging, and the shelling did no particular harm.

In October 1917 'C' Squadron moved from Kephalo to a new aerodrome at Gliko, on the north-east side of the island, where they were shortly reinforced by two D.H.4 aeroplanes. These were used in November for the bombing of bridges on the main Sofia-Constantinople railway, the enemy seaplane base at Nagara, and the flour mills and warehouses at Gallipoli. When the attack on the last-named objective took place on the 27th of November, it was observed that on the aerodrome at Galata, untenanted for many months, three hangars had been erected. These were bombed by the D.H.4's, with a Sopwith fighter escort, on the 1st of December, and thereafter patrols of Sopwith 'Camels' and 'Pups' occasionally visited the aerodrome, seeking combat. In a fight on the morning of the 2nd of December two enemy aeroplanes were shot down over the aerodrome, and in the afternoon, when the enemy attempted a raid on Gliko aerodrome, another was driven down.

The bombing raids by the D.H.4's were continued in 1918. In January, in the second of two attacks on the Lule Burgas bridge, direct hits were made: the permanent way was torn up and the bridge was holed. An approaching troop-train, forced to a standstill, was attacked with machine-gun fire, and when the troops jumped from the

train they were pursued with fire as they scattered into the fields. On the 21st of March 1918 one of three D.H.4's attacking Lule Burgas and other bridges found and bombed two trains in the station at Alapie. A hit on one of the trains with a 100-lb. bomb destroyed two wagons and damaged the permanent way: other bombs hit station buildings.

'B' and 'F' Squadrons at Mitylene

The aerodrome of 'B' Squadron at Thermi on the island of Mitylene was well placed for offensive action against the Smyrna-Panderma railway, and many attacks on the bridges were made throughout 1917. Other objectives in the first half of the year were the aerodromes at Paradisos and Kassimir, ripening crops, granaries, and shipping in Smyrna harbour.

At the end of July 'F' Squadron arrived at Thermi from Mudros for special bombing operations in the Smyrna area. 'F' Squadron brought five Sopwith bombers, three Sopwith 1½-strutter fighters, and a Sopwith 'Camel', and made their first attack on the 1st of August. The objective was the group of railway workshops at Halka Bounan, east of Smyrna, and fires started by direct hits from some of the bombs were fanned by a strong wind and the buildings were still burning long after the attack had ended. One of the escorting two-seater Sopwiths was shot down by gun-fire and its occupants killed. The squadron next made two attacks, on the 3rd of August, on the station and stores at Soma and obtained many hits. On the following day the enemy aeroplane base at Sanjak Kale in the Gulf of Smyrna was the target, and on the 12th the workshops and accumulated rolling-stock at Halka Bounan were bombed. On the 13th the Manisa railway bridge was hit, and two days later Soma was attacked again.

To counter the activities of 'F' Squadron the enemy air unit at Paradisos aerodrome was reinforced. When this became known a night attack on the aerodrome buildings was made by five bombers on the 30th/31st of August. The squadron continued its offensive until the 17th of

September, when the bombing aeroplanes were flown back to Mudros. The fighters, including three recently arrived 'Camels', were left behind at Thermi to deal with enemy attacks made by way of reprisal. During their brief stay on Mitylene the pilots of 'F' Squadron had covered a total of 13,000 miles on bombing expeditions. Much of this flying was done over the sea, but the squadron suffered no loss other than the one aeroplane shot down in the opening attack on Halka Bounan.

On the 9th of October 'B' Squadron moved from Thermi to a new aerodrome at Kalloni (Mitylene). While the move was in progress, Thermi was vigorously shelled. By this time, the squadron was short of personnel, and six of its aeroplanes were sent back to Mudros because there were no pilots to fly them.

Mudros

Mudros, on Lemnos Island, was the main store and repair base for the air units working in the Aegean. Also at Mudros was an airship station for anti-submarine duties, a seaplane station for similar work and for the air defence of the port, and the depot ship *Ark Royal*.

In the first six months of 1917, repair, supply, and anti-submarine work fully occupied the activities of Mudros, but in July a bombing offensive was begun, one of the objectives being Constantinople. The distant bombing was done by a Handley Page aeroplane which was flown from England to Mudros, a 2,000-mile journey, according to time-table, in spite of bad weather.¹

To create a diversion during the bombing expeditions of the Handley Page, and to accentuate the moral effect of the raids, day and night attacks were planned against the enemy aerodromes and other objectives on the Gallipoli Peninsula. For this purpose 'F' Squadron and the Greek naval squadron from Thasos were transferred temporarily to Mudros. The attacks were opened in the evening of the 3rd of July by five bombers and four fighters of 'F'

¹ The crew were, Squadron Commander K. S. Savory, Flight Lieutenant H. McClelland, Lieutenant P. T. Rawlings, R.N.V.R., Chief Petty Officer 2 (E) J. L. Adams, and Leading Mechanic (C) B. Cromack.

Squadron. Their target was Galata aerodrome or, alternatively, the flour mills and shipping at Gallipoli. The bombers found Galata occupied only by two widely spaced sheds, and they therefore attacked shipping in the inner harbour at Gallipoli and warehouses on the water front: four hits on the latter were claimed. Some hours later, in the dark, the Handley Page passed over the Peninsula, followed by a Henri Farman which made a second attack on Gallipoli and on Galata. The Handley Page got as far as Shar Keui on the west coast of the Sea of Marmara, but there met a hot wind from the south which caused her engines to overheat. She lost power and avoided a forced landing only by dropping a part of her load of bombs. She turned back and dropped the remainder of her bombs on a camp near Bulair, after which she made her base with some difficulty. Next evening warehouses at Chanak were bombed by 'F' Squadron, but the conditions were not again favourable for night flying until the 8th of July. At intervals during this night, targets on the Peninsula were attacked by pilots of the Greek squadron while the Handley Page was making her way towards Constantinople. In the Sea of Marmara, however, a strong head wind was encountered, and after three and a half hours the Handley Page had not progressed more than half way to her objective. The Constantinople raid was therefore abandoned and the bombs were dropped on the return journey on various targets in the Peninsula.

On the 9th of July the weather appeared more promising and, at 8.47 p.m., the Handley Page set out once more. This time all went well and Constantinople was reached just before midnight. The *Goeben* was found, surrounded by smaller craft including submarines and destroyers, in Stenia Bay. The Handley Page attacked the *Goeben* from 800 feet, but although it appeared at the time that some of the eight 112-lb. bombs dropped hit the battle cruiser, there is not much doubt that she was undamaged. Hits, however, were made on a destroyer, and an explosion and fire followed. The Handley Page pilot (Squadron Commander K. S. Savory) then flew to the upper waters of the Golden Horn and dropped two bombs on the *s.s. General*, the

reported German head-quarters, and afterwards found and attacked the Turkish War Office with the last two bombs. One of the latter hit the stables while the other burst near the main gate. The raid, which lasted thirty-five minutes, took the enemy by surprise. Not until it was nearly ended did searchlights and anti-aircraft guns become active. The Handley Page arrived safely back at Mudros at 3.40 a.m. While she had been away the Greek squadron had made three separate attacks on targets in the Peninsula, and a pilot from Imbros had bombed the enemy seaplane base at Nagara.

Shipping and warehouses at Chanak were bombed by 'F' Squadron on the 11th of July and a brig was sunk. The final attack by this squadron, before it left at the end of July for operations from Mitylene, was made on the 15th on a camp north-east of Suvla. When 'F' Squadron left Mudros for Mitylene, a detachment of four Henri Farmans, known as 'G' Flight, was established at Marsh aerodrome, Mudros, for night bombing, and for day and night anti-submarine patrols to supplement those made by the seaplanes.

On the 27th of July Lemnos was reconnoitred by an enemy seaplane escorted by two fighting seaplanes. Flight Lieutenant J. W. Alcock, who was on the aerodome at Mudros, went up in a 'Camel' and made contact with the enemy near Tenedos. He approached out of the sun and made a surprise attack on one of the fighting seaplanes, which went down, apparently in trouble. The 'Camel' pilot thereupon attacked, at close range, the second fighter, which nose-dived and landed near Sedd el Bahr in a damaged condition. The reconnaissance seaplane, meanwhile, had alighted on the sea under cover of the Turkish guns on the Peninsula.

On the 6th of August the Handley Page bombed warehouses and shipping at Panderma on the southern shore of the Sea of Marmara. Thereafter, as U-boat activity in the Aegean was increasing, the Handley Page was occasionally used to assist the aircraft employed on anti-submarine work. Meanwhile, experiments of some promise had been made by the Henri Farmans of 'G' Flight in co-operation

with hydrophone-fitted drifters. Wide areas were searched by the Henri Farman personnel, who made their reports, by Aldis lamp, to the drifters. On one such patrol, on the 15th of August, the observer in a Henri Farman sighted a U-boat periscope near Lemnos. Before the aeroplane got over her the submarine went under, but two 100-lb. delay-action bombs were dropped on her calculated position. A warning was given to the drifter by the aeroplane, which also sent wireless messages to Mudros. In answer to the wireless call, four other aircraft were sent out, but although they searched the area in conjunction with the drifter, the U-boat was not seen or heard again. At dawn next day a U-boat, possibly the same one, was observed eighteen miles south of the original position. As the Henri Farman dived to attack the submarine, engine trouble supervened and the aeroplane landed on the water, into which both the occupants were thrown. The observer, however, had, before the aeroplane landed, sent the position of the U-boat by wireless and she was subsequently hunted, but without success, by the drifter flotilla. As an extension of the idea, a seaplane was fitted with a hydrophone to work with the drifters. The seaplane was to alight and listen on the water every few miles, and experiments showed that a wide area of sea could thus be methodically patrolled.

On the 2nd of September the Handley Page set out for an attack on Adrianople. On the way, north-east of Samothrace, a U-boat was sighted in the moonpath and two delay-action bombs were dropped on her as she was submerging. The Handley Page then went on by way of Kuleli Burgas (two bombs) to Adrianople, where her main load was dropped on the station and neighbouring buildings: she then returned safely to her base. While she had been away, seven enemy bombing attacks had been made on Mudros, causing slight damage, but no casualties, and in retaliation four Henri Farmans, one of which failed to return, had attacked Chanak.

On the morning of the 30th of September three enemy seaplanes, two of them single-seater fighters of a type known to the Royal Naval Air Service as 'Blue Birds', and

the other a two-seater reconnaissance seaplane, were reported to be approaching Mudros. Three pilots went up at once to engage them, but only two came into action. They were Flight Lieutenant H. T. Mellings in a Sopwith Triplane, and Flight Lieutenant J. W. Alcock in a Sopwith 'Camel'. The Triplane pilot shot down one of the 'Blue Birds', which dived into the sea and broke up, and the 'Camel' pilot eventually forced the other to land, and its wounded pilot was subsequently picked up by the *Acheron*. The German two-seater was pursued to the Dardanelles, where a Sopwith 'Pup' pilot from Imbros (Flight Lieutenant P. K. Fowler) joined in the attack. The observer in the German seaplane was apparently wounded, but, flying low down, the two-seater came under cover of the guns of the Dardanelles forts and escaped destruction. Although the aeroplane flown by Flight Lieutenant Alcock is set down in the official reports as a Sopwith 'Camel', there is some evidence that it was of Alcock's own design. From a German twin-engined bombing aeroplane shot down by naval pilots in April 1917, on the Macedonian front, a Benz engine, in good order, had been taken. The engine had been sent to Mudros and Flight Lieutenant Alcock had sought, and been given, permission to design an aeroplane for the Benz. 'He did so,' says Lieutenant-Colonel L. H. Strain, 'but except for one short flight, it had not been tried out, 'but Alcock was going to test it on the morning of the 30th 'of September. The engine had been warmed up, but 'Alcock was in his bath when the enemy reconnaissance 'appeared. He put on his pyjamas, ran to the machine, 'got into the air, bagged Muller¹ before they were out of 'sight. . . . The machine he designed was 20 m.p.h. faster 'at 10,000 feet than anything we had. We sent the 'drawings home. Alcock had no knowledge of aerodynamics, etc., but he had a natural genius for knowing where 'stresses came and how to meet them.'

In the evening of the same day Flight Lieutenant Alcock set out in the Handley Page to bomb the railway stations at Constantinople and Haidar Pasha, but after

¹ The German pilot who was picked up by the *Acheron*.

a flight of an hour and a half one of the two engines went out of action, and the pilot turned back towards Mudros. He was, however, forced to land in the Gulf of Xeros, and although the Handley Page floated for two hours, during which time the crew fired Very lights, nothing of the accident was seen from British destroyers lower down the Gulf. The crew had eventually to take to the water and make an hour's swim to land. They were found by the Turks on the Peninsula next morning and were eventually sent to Constantinople as prisoners.¹

The Sortie of the Goeben and Breslau

Routine anti-submarine patrols, and occasional bombing, kept the Mudros aircraft occupied down to the end of the year. In January 1918, however, the whole of the forces in the Eastern Mediterranean were stirred into special activity by the sortie from the Dardanelles of the two German cruisers, *Goeben* and *Breslau*. A message that these cruisers had come out was intercepted at Mudros on the morning of the 20th of January, and all aircraft were immediately ordered to concentrate at Mudros and Imbros. The two cruisers had passed out of the Dardanelles about 5 a.m. with the object of attacking the two British monitors in Kusu Bay, Imbros, and of bombarding Mudros. Off Mavro Island the *Goeben* struck a mine, but the cruisers went ahead and they opened fire on the monitors and on general shipping in Kusu Bay about 8 a.m. Six or seven salvoes were fired, and these destroyed the two monitors (*Raglan* and *M.28*). The cruisers then turned off towards Mudros, but aircraft from Imbros were now on the scene and they began to

¹ Flight Lieutenant J. W. Alcock had taken his Royal Aero Club certificate in November 1912. He joined the Royal Naval Air Service in November 1914, and had served as an instructor at Eastchurch before going to the Mediterranean. After the Armistice he returned to England, took up an appointment with the Vickers firm and, with Lieutenant A. W. Brown as his navigator, made the first flight across the Atlantic on 14th/15th June 1919. The feat won the *Daily Mail* prize of £10,000, and each airman was created K.B.E. While piloting an aeroplane to Paris on the 18th of December 1919 Sir John Alcock made a rough landing in a mist near Rouen and was fatally injured.

attack with bombs. Before any hits were made, the bombing, indirectly, brought about the destruction of the *Breslau*. The anti-aircraft shells fired by the guns from the *Goeben* were seen to be falling close to the *Breslau* and the latter ship was thereupon ordered by her consort to take station ahead. As she moved to obey orders the *Breslau* was so harassed by the attacking aircraft that she zigzagged into a mine-field near Rabbit Island and had her stern shattered by a mine. Almost at the same moment she received a direct hit from a bomb. The *Goeben* turned to take the *Breslau* in tow, but soon gave up the attempt and left the damaged cruiser to her fate. The *Breslau* struck more mines and finally sank. Turkish destroyers which attempted to help her before she went under were kept at a distance by British ships with the aid of aircraft which observed for their fire.

The *Goeben*, meanwhile, with fine determination, continued her journey towards Mudros, but she struck a mine on the way and her commander thereupon decided to go back. He failed to find the gap he had made in the mine-field off the Dardanelles and struck another mine going in. As the *Goeben* entered the Straits two bomb-carrying Blackburn 'Baby' seaplanes, escorted by a Greek pilot in a 'Camel', appeared over her, but they were promptly engaged by a formation of ten enemy seaplanes. In a sharp fight, three of the enemy seaplanes were driven down by the 'Camel' pilot (Commander A. Moraitinis), and one of the Blackburn 'Baby' seaplanes (Flight Sub-Lieutenant W. Johnston) fell in flames. By this time the hostile formation had been broken and the second Blackburn 'Baby' pilot (Flight Sub-Lieutenant R. W. Peel), persisted in his bombing attack and aimed his 65-lb. bombs at the *Goeben*, but without the luck of a hit. He was then forced, by engine trouble, to land in the Straits near a Turkish destroyer, but his engine proved sufficiently serviceable to enable him to taxi and hop round the Cape, and he eventually reached Imbros safely. Soon after this attack two D.H.4 aeroplanes found the *Goeben*, apparently in trouble, and they saw her run aground south of Nagara. Before returning to report her plight, the D.H.4's dropped

their bombs, one of which scored a hit on a vessel making to assist the German cruiser.

When the position of the *Goeben* became known aircraft were sent up to take photographs, and the concentration of bombers and fighters at Imbros and Mudros was pressed forward. In the afternoon there were low clouds and patches of mist, but four 112-lb. bombs were dropped, without direct results, by D.H.4 aeroplanes. At the same time a widespread air patrol of the waters off Mudros was made by all available aircraft to test the truth of statements, made by rescued members of the crew of the *Breslau*, that mine-fields had been laid outside the harbour by U-boats. No mines were discovered and it is a point of interest that the prisoners' statements, whether they were made in good faith or with the intention to deceive, had the effect of diverting temporarily the activities of aircraft from the possible bombing of the *Goeben*.

The attack on the battle cruiser was resumed at dawn next morning, the 21st of January, but clouds at 500 feet and mist hampered the bombing operations. Three separate attacks were made during the day, but only one bomb, of 112-lb. weight, hit the *Goeben*. After dark, nine aeroplanes were sent to the Straits, but they got a poor view of their target and no hits were claimed. To help the Royal Naval Air Service in their task, the Royal Flying Corps at Salonika took over the work of the naval air station at Stavros and also sent aircraft to Mudros to take part in the bombing.¹ On the 22nd and 23rd day and night attacks were kept up; one direct hit was claimed on the morning of the 22nd, with a 112-lb. bomb dropped from a D.H.4. All the bombing formations were escorted by fighters, but there was no opposition other than heavy anti-aircraft gun-fire, by which a Greek pilot was shot down on the 23rd. On the 24th of January the carrier *Empress* arrived and her pilots were used to relieve the overworked officers at Mudros and Imbros. Next day, also, the *Manxman* reached Mudros with badly needed supplies of bombs. Strong winds and low clouds continued

¹ Three Royal Flying Corps aeroplanes arrived at Mudros on the 21st, three on the 22nd, four on the 25th, and one on the 28th January. See p. 363.

to make bombing difficult up to the morning of the 27th. On the evening of the 24th a monitor, with aircraft observation, attempted to fire at the *Goeben*, but just when her shells were being signalled near the target a haze spread over the Straits and no further spotting was possible. On the morning of the 27th a 'Camel' pilot, in difficult conditions of weather, reached the Straits to find no trace of the German cruiser, but a little later another 'Camel' pilot thought he could distinguish her in the mist. She had, in fact, got off on the 26th, and by the morning of the 27th had reached Constantinople under her own steam, but it was not until the morning of the 28th that the weather was clear enough for air observers to say definitely that she had gone. During the few days in which she had been grounded in the Straits fifteen tons of bombs had been dropped. Pilots had been tireless in their efforts to disable their enemy, but they had no luck, nor could they be expected to achieve much with the only bombs immediately available which were of 65-lb. or 112-lb. weight, too light to inflict serious damage on a ship of the *Goeben's* construction.

Two and a half years before this, in August 1915, a Short seaplane from the *Ben-my-Chree* had obtained a direct hit with a 14-inch torpedo on a steamer in the Sea of Marmara,¹ but no reliable torpedo-carrying aircraft were in the Eastern Mediterranean when the *Goeben* ran aground. An attempt was made to fit a 14-inch torpedo to one of the old Shorts in the *Ark Royal*, but the seaplane, so loaded, would not move off the water. When the *Manxman* arrived in Mudros harbour from Brindisi at 7 a.m. on the 25th of January, she brought with her two seaplanes fitted with 18-inch torpedoes, but there was an unaccountable delay in sending up her seaplanes, and, on the 26th, the day of the *Goeben's* departure, the wind freshened and the sea was judged too choppy for the torpedo-loaded seaplanes to get away. Meanwhile the officers of the *Ark Royal* had succeeded in fitting one of the Short seaplanes to take depth-charges of 300-lb. weight, or 18-inch warheads. On the night of the 27th,

¹ See Vol. II, p. 64.

when it was still doubtful whether the *Goeben* had gone, a pilot set out in a Henri Farman aeroplane, loaded with a warhead, to search for her. The visibility over the Dardanelles was poor, and although the pilot could not locate the *Goeben*, he decided to drop the warhead, from 1,600 feet over Nagara Point, in the hope that the ship, although not visible through the mist, might still be aground. The resultant explosion was so heavy as to shock the anti-aircraft gunners into immediate silence. Other naval seaplanes were over the Straits that night to keep the attention of the Dardanelles garrison off the entrance in order to make easier the passage of a British submarine, the *E.14*, which had been sent out in the afternoon to attack the German cruiser. The *E.14* got through to Nagara, but found that her quarry had gone and that her gallant attempt had been made in vain. Nor did she otherwise have the luck she deserved: on her homeward journey she was sunk by gun-fire off Kum Kale. Many subsequent reconnaissance flights, by D.H.4 aeroplanes fitted with extra fuel tanks to give an endurance of seven hours, were made to Constantinople to keep watch on the *Goeben* in Stenia Bay; she never came out again.

The Southern Aegean

In February 1917 a small seaplane base (four seaplanes) for anti-submarine work had been established at Suda Bay in the island of Crete. Two months later the Vice-Admiral Commanding the Eastern Mediterranean Squadron had reported that four or five similar stations, on the Aegean Islands of Syra, Kos, and Skyros, would enable him to maintain an effective patrol of the southern Aegean, and he had asked for one or two extra carriers from which these stations could be supplied and administered. The Admiralty, however, had replied that no carriers or aircraft were available, and, as a temporary measure, the *Peony* had been fitted in May 1917 to carry three seaplanes to search the smaller Aegean Islands for U-boat bases. Between the middle of May and the end of July, from Leros Island, her seaplanes made a systematic search of

the gulfs along the Asiatic coast and of the neighbouring islands from Rhodes northwards to the Gulf of Scala Nuova. In August the *Peony* went to Port Vathi, Samos Island, and settled to a routine of reconnaissances and patrols. To provide aircraft patrols of the Doro, Mykoni, &c., channels, in which U-boat activity had been pronounced, a seaplane station was opened on the Island of Syra in December 1917.

East Indies Squadron

In January 1917 the *Ben-my-Chree* was destroyed. On the 8th she had left Port Said to work with a French naval squadron on a reconnaissance patrol of the coast of Asia Minor. She was ordered to operate from the Island of Kastelorizo, which is situated less than a mile from the mainland. The weather, on arrival, was too stormy for immediate operations and the *Ben-my-Chree*, on the advice of the French admiral who was already inside, went into the harbour and anchored. This was on the morning of the 9th of January, and in the afternoon shells from an undiscovered Turkish battery on the mainland began to fall near the carrier. The fourth shell set the hangar on fire, and as the petrol shot up in flames it became clear that the *Ben-my-Chree*, which had been a thorn in the flank of the Turks for eighteen months, was doomed. In a forlorn hope ten hoses were led to the hangar, but they had no effect, and as shells were still striking the vessel Commander Samson gave the order for 'Abandon ship' to be piped, and the crew swam and waded ashore. The bombs on board the carrier exploded intermittently up to the morning of the 13th, by which time the hulk of the *Ben-my-Chree* had settled in shallow water.¹

To replace her, the *Empress* was withdrawn from the Eastern Mediterranean Squadron and, after refit at Genoa, joined the East Indies Squadron in April 1917. Meanwhile the few seaplanes carried in the *Anne* and in the *Raven II*

¹ The *Ben-my-Chree* was salvaged after the war and towed into the Piraeus. Her end is described in *Fights and Flights* (Air Commodore C. R. Samson), pp. 342-6, and in *In the Side Shows* (Captain Wedgwood Benn), pp. 143-53.

had to do all the air work that was required. On the 16th of January the *Anne* went into the Red Sea to help the naval forces co-operating in the Arab advance on Wejh.¹

About this time news was received of a German raider, equipped with a seaplane, in the Indian Ocean, and there was talk of mines being found off Colombo. She was the *Wolf* (Captain Karl Nerger), which had left Germany at the end of November 1916 and had journeyed by the Cape. As part of the measures taken to hunt the *Wolf*, Commander Samson was ordered to take one of the carriers and join the French cruiser *Pothuau* at Aden. He chose the *Raven II*, which was slightly faster than the *Anne*, and, with some recently arrived 240 horsepower Short seaplanes, and one Sopwith 'Baby' on board, left Port Said on the 10th of March. The *Raven* reached Aden on the 16th, and, while awaiting the *Pothuau*, her pilots made reconnaissance and bombing flights over the Turkish positions. When the French cruiser arrived, it was decided that the first centre of search should be the group of Laccadive Islands, after which the ships would go on to Colombo to coal before exploring the Maldive Islands. On the way to the Laccadives the Shorts were hoisted out from time to time and search was made within a radius of about fifty miles from the ships. Every island and atoll of the Laccadives was explored, but there was no sign of the raider. 'Flying amongst these islands', wrote Air Commodore Samson, 'was most exhilarating, 'as you could see for miles when in the air, while below 'you saw the bottom of the sea, and hundreds of islands 'of all shapes and sizes, some above water, others being 'made beneath the sea, some day to rise above the waves. 'Most of the time we used to take the *Raven* inside the 'outer reefs whilst the *Pothuau* cruised outside. . . .'²

On April the 2nd the ships arrived at Colombo and,

¹ See p. 222. The *Anne* returned to Port Said at the end of January 1917. At the end of February she went first to Haifa, and then to Beirut. From off these ports her seaplanes made a series of reconnaissances. On her return to Port Said in March 1917 she ceased to be used for seaplane work, and was eventually reconverted as a cargo ship. Her place was taken by the *City of Oxford*. (See p. 419.)

² *Fights and Flights*, p. 349.

after coaling, went on to the Chagos and the Maldive groups. After a search of the islands of the latter group, on the 21st of April, two officers of the *Raven*, in one of the Shorts, were overtaken by a storm and failed to find their parent ship. The *Raven* looked for them until the 24th, but found nothing more than a patch of oil and a ship's biscuit, which prompted her to report, on return to Colombo, that the officers were missing and believed drowned. The two officers, Flight Sub-Lieutenant G. D. Smith, pilot, and Lieutenant W. C. A. Meade, R.N.V.R., observer, were, indeed, very much alive. They had landed, in the dark on the 21st, on a coral reef off the most southerly island of the Maldives and had had to wait until after midnight before the rising tide enabled them to push the seaplane off again. The observer then climbed to the top of the centre section and from there, aided by the lightning and by lights fired from his Very pistol, he was able to direct the pilot through the coral reefs as they taxied from one island to another in search of a channel. When the stock of Very lights was exhausted the seaplane was beached on the shore of an island and made fast to a palm-tree. At dawn the receding tide had left the Short high and dry and an inspection revealed minor damage to a float and to the ailerons.

The islands were being lashed by rains and the two officers therefore built themselves a rough shelter made from palm-trees. For food they shot down coco-nuts with their Lewis gun. In the afternoon, with difficulty in a high wind, the seaplane, which had been refloated by the tide, was flown off, but the officers were unable to recover their clothes which they had discarded while the seaplane was manœuvred to keep it free of the bank. Only an hour's supply of petrol was left, and course was headed north. The Short eventually alighted in a lagoon, and the pilot and his observer, after a formal farewell, each of the other, took to the (presumably) shark-infested water and made a long swim for the shore. For costume one wore a Gieves waistcoat and the other an airbag which he had cut from the fuselage of the seaplane. They reached land safely, covered themselves with palm leaves, and fell asleep, but

at midnight they were awakened by three natives who, when greeted with the word *Salaam*, fled.

Next morning the officers searched the island, but found no inhabitants, so they set about the gathering of material to make a raft. Later in the day, however, they were able, by waving rags on a stick, to attract the attention of fishermen who had appeared in the lagoon, but these people, suspicious of white men who had come among them from the skies, went back to their own island to collect reinforcements. When the fleet of feluccas returned the officers swam out to the boats and eventually persuaded the reluctant natives to give them passage and also to take the seaplane in tow. The procession put into Fiale Island, where, for four days, the officers were imprisoned in the quarters of the unmarried male natives, passing their time with an interchange of songs and dances with their rescuers. On the fourth night they were taken, by native dhow, to the home of the Sultan on Male Island, where they were clothed in the uniform of the Sultan's bodyguard and royally entertained until a dhow was ready to sail to Colombo. The officers rejoined the *Raven* at Colombo on the 6th of May and the carrier then returned to the Maldives to pick up the Short seaplane. It was found on arrival that a rough shed had been constructed to protect the Short, and the seaplane was hoisted on board the *Raven* little the worse for its adventures, as were two goats, a young bull, two turtles, and other gifts pressed on the party by the Sultan of Male.¹

From Colombo many flights were made by the *Raven's* seaplanes, but nothing of the *Wolf* was seen, and on the 21st of May the carrier sailed from Bombay with the *Brisbane* and *Exmouth* in escort of a convoy to the Red Sea. A brief stay was made at Aden while the *Raven's* seaplanes, at the request of the General Officer Commanding the Aden Field Force, reconnoitred the Turkish positions, and the carrier then returned to Port Said, where she arrived on the 10th of June.²

¹ This adventure in the Maldives formed the basis of the short story, *A Flight of Fact*, by Rudyard Kipling.

² While the *Raven's* seaplanes had been searching the Maldives, the *Wolf*

While the *Raven II* had been away, seaplanes (four 240 horse-power Shorts) from the *Empress*, which had arrived at Port Said early in April, had operated off the coast of Palestine. On the 23rd of June the seaplanes, in co-operation with Royal Flying Corps aeroplanes, bombed Tul Karm, where a large accumulation of stores had been reported.¹ In the middle of July the carrier went across to Asia Minor to make a bombing attack on cotton factories and crops near Adana. The attack took place, from off Karatash Burnu, on the 15th of July and the four Short pilots reported hits on the factories. In August the *Empress* was off Beirut, where a successful attack was made on quayside store sheds. Four seaplanes took part in the raid and dropped seventy-eight 16-lb. and four 65-lb. bombs. Fires were started in the sheds from which smoke spread miles out to sea. On the 27th of September seaplanes from the carrier again attacked Beirut, in conjunction this time with the *Grafton*, whose fire, directed by a seaplane observer, caused further damage to the quayside buildings. On the 9th of October, during an attack on the Chikaldir bridge, one of the Shorts was destroyed by its own bombs, and another was made unfit for further use by Turkish gun-fire. A third Short, which went off later to bomb the locomotive sheds at Adana, failed to return. The *Empress* thereupon went back to Port Said for reinforcements.

Meanwhile the former kite-balloon ship, the *City of Oxford*, now converted as a seaplane carrier, had arrived at Port Said. In the third battle of Gaza, directed by General Sir Edmund H. H. Allenby, which opened on the 31st of October 1917, seaplanes from the *Empress*, *City of Oxford*, and from the *Raven II*, took part. The main initial attack of the military offensive was made against Beersheba, and was followed by a subsidiary attack on Gaza on the 1st

was far away, making towards Australia. She did, however, on her return to the Indian Ocean, spend some time in the Maldivé Islands in September and October 1917. The *Wolf* eluded capture and got back to Germany in February 1918. She had kept the sea for 14½ months and had sunk twelve vessels, in doing which she had been aided by her seaplane, the *Wolf Cub*.

¹ See p. 231.

of November. In the Gaza attack the naval forces co-operated by bombarding the Gaza defences and the railway and depots north of the town. One of the bombarding ships was the 14-inch monitor *Raglan* which had on board a seaplane from the *City of Oxford*. On the morning of the 30th of October, the day before the military attack on Beersheba, the *Raglan*, spotted for by her seaplane, shelled the railway station at Deir Sneid, five miles inland north of Gaza. Several hits on the station were obtained and the air observer then switched the monitor over to an ammunition dump which he had discovered near the station. His corrections led to a direct hit with the ninth round, the dump exploded, and the station and much of the railway track were demolished. The monitor was then ranged on a road bridge across the Wadi el Hesi at Deir Sneid, which was hit. As a result, wheeled traffic could not cross and had to be diverted by way of the sandy wadi, a process which caused delay. The seaplane was afterwards attacked by a German Halberstadt fighter and was forced down on the water. It was salvaged by the *Raglan*, but was wrecked on board by the concussion of the fire of the monitor's 14-inch gun. In the afternoon and again next day the *Raglan* continued her bombardment with the aid of seaplanes from the *City of Oxford*.

On the 1st of November, while the *City of Oxford's* seaplanes were spotting for the river gun-boats, *Ladybird* and *Aphis*, off the Wadi el Hesi, whither they had proceeded in company with the *Raglan*, the *Raven II*, operating from the same area, helped to spot the fire of the French coastguard ship, *Requin*.

Next day the *Empress*, which now carried two Hamble 'Baby' and four Sopwith 'Baby' seaplanes, took a part in the operations. To keep alive the Turkish anxiety that a landing might be made on the coast behind the right flank, Rear-Admiral T. Jackson had organized a feint embarkation at Deir el Balah in the afternoon of November the 1st. Men of the Egyptian Labour Corps had been put ashore from about 4.30 p.m. onwards, but when it became too dark for the enemy to see what was happening, they had been re-embarked. It was difficult to employ

seaplanes in a way that would keep up the impression that the landing operation had something behind it, but Rear-Admiral Jackson allotted them objectives of military importance, mainly in the hope that the bombing would prolong the enemy's anxiety. From off El Haram, north of Jaffa, three seaplanes from the *Empress* flew to Jaljulye on the morning of the 2nd and attacked the railway bridge with six 65-lb. bombs: the line was damaged on both sides of the bridge which itself escaped a hit. On the return of the aircraft the *Empress* went north to Haifa to attack her second objective, an oil factory near the port. Four hits on the factory were claimed, but two of the seaplanes, forced down in Haifa Bay, were lost after the pilots had been rescued by the French destroyer *Coutelas*.

While the *Empress* had been coasting northwards, seaplanes from the *Raven* were over the Wadi el Hesi directing the fire of the *Raglan* and *Grafton* on a railway embankment alongside the bridge put out of action by the *Raglan's* fire three days previously. The *Raglan* and *Grafton* had been allotted the task of hampering the movements towards Gaza of Turkish reserves believed to be north of the Wadi el Hesi, but as nothing of these reserves was seen, the fire of the ships was directed against the railway embankment as an alternative target. The firing was continued on the 3rd and again on the 4th, by which time the embankment and stretches of line on each side of it had been damaged. A train which was derailed through a settling of the line, consequent on damage to the embankment, caused a blockage for some time.

By the 4th of November the main defences of Gaza had been captured (Beersheba had fallen on October the 31st), but the northward advance along the coast was held by Turkish batteries in the neighbourhood of En Nezle. Before the *Raglan* attacked the railway embankment over the Wadi el Hesi on the 4th, she and other monitors had fired on these battery positions with seaplane observation from the *City of Oxford*. The fire was continued, again with the help of the seaplanes, on November the 5th and 6th.

With the fall of Gaza on the 7th, the Turks grouped

field guns north of Deir Sneid and occupied trenches south of Ashkelon with the object of stemming the advance along the coast. The *Requin*, in company with the *City of Oxford*, followed the Turkish retreat and fired on the new enemy positions. The seaplane observer reported convoys of transport at the railway junction of Julis, north-east of Ashkelon; the monitor *M.15* and, later, the *Raglan* were ranged on the convoys and scored many hits.

On the 8th, when the British troops were advancing along the coast, the *City of Oxford's* seaplanes did some spotting for the monitors *M.15* and *M.31*, and for the *Aphis*, *Ladybird*, and *Requin*, to keep down the fire of the Turkish batteries. This ended the special co-operation of the seaplane carriers in the Palestine offensive and the *City of Oxford* returned to Port Said. From that port her seaplanes, together with those of the *Empress*, began a series of anti-submarine, mine, and convoy patrols. In the middle of January 1918 a sub-station for this work was opened at Alexandria with two Short seaplanes.¹

Towards the end of January 1918 the *City of Oxford* gave up some of her pilots and observers to the *Empress* when that carrier was sent to Mudros to take part in the attacks on the *Goeben* in the Dardanelles. On the return of the *Empress* the personnel went back to the *City of Oxford*, which was ordered to the Red Sea to work under the orders of the Senior Naval Officer of the Red Sea patrol. She was off Loheia on the 22nd of February 1918, and sent up seaplanes to reconnoitre and photograph the Turkish positions at Jebel el Milh and Zohra. The former place was bombed for some days afterwards, and when, on the 28th, the Idrissi tribesmen got a footing on the hill, the opposing Turkish guns and troops were continuously attacked. At the request of the friendly Arab commander, the Turkish head-quarters at Zohra were bombed to impress the Arab population. The effect was immediate: the Arab tribes which had hitherto adhered to the Turkish cause deserted and went over to the Idrissi.

¹ In the three months January to March 1918, seaplanes from Port Said and Alexandria made 120 patrols, during which fifty convoys were escorted.

MEDITERRANEAN AND RED SEAS

SPHERE OF AIR OPERATIONS

1917 - 1918.

RAILWAYS ———





On the 19th of March 1918 the *City of Oxford* went north to Wadi Habil, whence demonstration flights were made over Habil and Medi, and bombing attacks were made on the Turkish positions at Jebel el Milh. On the 22nd the carrier was back again off Loheia and made further demonstration flights to impress the Arab population before she returned to Suez. During the month in which the *City of Oxford* operated in the Red Sea, her four seaplanes made fifty-eight flights, in the course of which sixty-three 16-lb. and fifty-two 65-lb. bombs were dropped.

CHAPTER VIII

TRAINING DEVELOPMENTS

PART I. HOME

ROYAL FLYING CORPS, 1917

At the beginning of 1917 the expansion of the Royal Flying Corps to 106 service squadrons and to 97 reserve,¹ or training, squadrons had been approved. This meant an addition to the existing programme of twenty service squadrons and thirty-seven reserve squadrons. The main training developments at home in the first half of 1917 were to meet the new requirements. In the first place the Training Brigade, commanded by Brigadier-General J. M. Salmond, was decentralized in January when three 'Group Commands' were formed with head-quarters at York (Northern), London (Eastern), and Salisbury (Southern). The new commands were made responsible, under the direction of Brigadier-General Salmond, for the training and administration of all Training Brigade units within their defined areas.

To meet the demands for the expanded programme advantage was taken of the resources offered by Canada,² and of the existing training organization in Egypt,³ but two new wings were also formed at home in May and June. The delay in forming these additional wings was mainly due to a shortage of training-type aeroplanes, a limiting factor which continuously cut across the plans for training expansion.⁴ There was also difficulty about providing land for new aerodromes, and labour and material for buildings.

New schools had been opened in January, at Farnborough for Photography and the preliminary training of Armourers, and at Loch Doon and at Turnberry for

¹ The original approval was for 95 reserve squadrons, but two more, specially for night flying, were added in January 1917.

² See pp. 458-68.

³ See pp. 449-58.

⁴ Figures which are available for March 1917 show that out of an approved establishment of 1,041 aeroplanes, excluding service types, no more than 763 were actually held by the Training Brigade. Problems of supply and man-power will be dealt with in Volume VI.

Aerial Gunnery. The intention was to move the existing gunnery school from Hythe to Loch Doon, but after much work had been done the site was abandoned as unsuitable because of the weather conditions. The school at Turnberry was employed to give final gunnery instruction to fighting pilots, and the school at Hythe was reserved, henceforward, for the training of observers in the Lewis gun. For pilots, gunnery instruction began in the cadet battalions, was continued in the schools of military aeronautics and in the elementary and higher training squadrons, and was completed at Turnberry or, later, at other gunnery schools.¹

In June 1917, with the coming of the German daylight aeroplane bombers to London, decisions were taken of which one effect was a formidable expansion of the training organization. It will be recalled² that the War Cabinet directed the Air Board to consult with the other service departments to prepare a comprehensive plan for the further development of the Royal Flying Corps. As a result the Government decided in July upon an expansion of the service squadrons to two hundred, with a similar increase in the number of training squadrons: a beginning was to be made at once with the provision of the necessary additional aerodromes and personnel.

Among the departmental memoranda which were prepared in connexion with the new scheme of expansion there is much that is illuminating. It was stated that the number of pupils under training as pilots, in June 1917, was 5,841, and that eight months would elapse before this number, less reductions due to wastage, would be fully trained.³ Allowing for normal wastage (killed, injured, sick, unsuited for flying, &c.) it was to be expected that 4,650 would ultimately qualify as pilots.

To meet the new requirements, 3,252 trained pilots

¹ Two additional gunnery schools had been opened before the end of 1917, namely, No. 3 at New Romney in Kent (in August) and No. 4 at Marske, Yorkshire (in November).

² See p. 29.

³ The eight months for each pupil were made up as follows: in a Cadet Wing, 2; School of Military Aeronautics, 2; Elementary Training Squadron, 1; Higher Training Squadron, 2; post graduation course, 1.

would be needed during the six months ending 31st December 1917, and 2,199 from January 1918 to the end of March, that is, a total of 5,451, and this would mean that there would, on existing figures, be a deficiency of 801. One method of meeting this deficiency would be to reduce the training period, but this, it was pointed out, had been tried before with results which had proved that it was extremely undesirable. The real solution would be to obtain a number of trained army officers who could be sent direct to schools of military aeronautics and so save the two months of the cadet course. Allowing for a wastage of officers of 17 per cent. during training, 960 would be required to begin their course during the next three months if they were to be ready to take their place as pilots in the critical period at the beginning of 1918.

Whereas the average monthly requirements of pilots would be 542 for the six months July to December 1917, and 733 for the three months January to March 1918, a figure of 1,293 would be reached for the nine months April to December 1918. The existing rate of production was entirely inadequate to meet this expansion, and it was essential that an increased flow of cadets should begin at once. The wastage during the various pupil courses was about 28 per cent., and to produce 1,300 pilots some 1,800 pupils had therefore to pass every month into the Cadet Wings. Each of the existing three wings took 300 cadets a month and it would be necessary to establish three additional wings to cope with the larger flow of pupils. It was stated that the estimated average effective service of a pilot or observer in France was four months in the two-seater corps and night-flying squadrons, and $3\frac{1}{2}$ months in the fighter-reconnaissance and day-bombing squadrons, while the effective service of a pilot in a single-seater fighter squadron was no longer than $2\frac{1}{2}$ months.¹

The specific requirements allowed for may be set out in tabular form as shown on the opposite page.

On the 5th of August, as a result of the new development programme, the Training Brigade was raised to the status of a Division, and the sub-commands became

¹ These estimates took sickness as well as battle casualties into account.

Training Brigades, namely, 'Northern' (York, Brigadier-General P. L. W. Herbert), 'Eastern' (London, Brigadier-General R. E. T. Hogg), and 'Southern' (Salisbury, Brigadier-General H. C. T. Dowding). An additional

Pilots, Royal Flying Corps

	1917	1918	
	July- December.	January- March.	April- December.
To complete establishment of squadrons in France	460	400	1,580
To complete establishment of Home Defence Squadrons	Nil	Nil	90
To replace wastage, France	2,693	1,749	9,752
To replace wastage, Home Defence	99	50	216

Grand total of pilots required, 17,089.

Training command, known as 'Western Group' (Colonel U. J. D. Bourke) was formed in September 1917.

A new School of Military Aeronautics, No. 5, similarly organized to the existing schools at Reading (No. 1) and Oxford (No. 2), was formed at Denham in September 1917.¹ As soon as the school at Denham had started, another, No. 6, was organized there in November, and in January 1918 moved to Bristol, where it remained until the end of the war.

In July 1917 the existing Cadet Wings at home were, No. 1 at Denham,² and No. 2 at Hursley Park (Winchester).³ Additional Cadet Wings, Nos. 5 and 6, were formed, on paper, at the beginning of August 1917, and Nos. 7 and 8 early in September, but almost at once such personnel as had been allocated to the two last-named were sent to strengthen No. 5 Wing which settled down at Hastings.⁴ No. 6 Cadet Wing remained as a nucleus

¹ No. 3 School of Military Aeronautics was in Egypt and No. 4 in Canada.

² No. 1 Cadet Wing moved to St. Leonards in August.

³ No. 3 Cadet Wing was being formed in Egypt. No. 4 was in Canada.

⁴ Nos. 7 and 8 Cadet Wings were never really resuscitated. In July 1918, however, Nos. 1 and 2 Officers' Technical Training Wings were renamed Nos. 7 and 8 Cadet Wings.

only until January 1918, when it became an effective wing at Hastings. There was also at home, in process of formation at Hursley Park, an Officers' Technical Training Corps. This had been begun as a result of a suggestion of Major-General W. S. Brancker, the deputy director-general of military aeronautics, that cadets might be entered a little younger than the age limit for the cadet wings (18 years). They could go to the preliminary technical school at 17 $\frac{10}{12}$ years and pass, in due course, to the cadet wings with a ground work of knowledge in engines, instruments, aeroplane construction, and machine-guns. No. 1 Officers' Technical Training Corps was opened at St. Leonards in August,¹ and No. 2 at Hastings on the 1st of November 1917. The number of pupils allowed for was 600-800 at each wing (the nomenclature was changed from corps to wing in October) and the duration of the course was three months.

In August 1917 the section for Equipment Officers, attached to the School of Military Aeronautics at Reading, became a school of its own with the title 'Equipment Officers' School of Instruction'. It continued to give preliminary training to prospective technical and administrative officers in a course lasting eight weeks: in November 1917 the school moved to Henley.

Other schools grew up in various directions. There was one for bombing, opened in Langham Place, London, in October 1917, mainly to train instructors. Another, the 'Artillery and Infantry Co-operation School', to train about 500 observers a month, was established at Hursley Park, Winchester, in October when the existing school at Brooklands was decentralized.² Yet another, to train officers and men as inspectors of aircraft, was formed at Watford in August 1917. Those selected for the course at the School of Inspection were required to possess practical experience in rigging, engine tuning, fitting, the timing of guns, and in the installation of instruments.

In November 1917, arising out of the Government decision to open the bombing offensive against targets in

¹ It was begun at Hursley Park and moved to St. Leonards.

² See pp. 436-7.

Germany, Major-General Trenchard wrote from France to point out the need for better training for pilots of long-distance day and night bombers. 'It is of the 'utmost importance', he said, 'that these pilots should be 'above the average and have more experience in long-distance flying than other types of pilots. I find pilots 'who have only done four or five months' flying are of 'little use for this work, and therefore I would request 'that a most careful selection may be made and the fullest 'training be given to pilots for this work. Otherwise it 'will necessitate long-distance machines being used on 'short trips for a long time until pilots gain the necessary 'experience. These pilots should be trained to use their 'compasses and they should also be taught map-reading 'and be able to find their way by the country. . . .'

Arrangements to improve the training of bombing pilots in navigation had, in fact, been made. Selected officers, at first called Compass Officers, but later known as Aerial Navigation Officers, had been posted to the Royal Naval Compass Laboratory at Slough for a six weeks' course in navigation, and had rejoined the VI Brigade to instruct pilots. Some time had necessarily to elapse before the advantages of the improved training in navigation at home could become noticeable in the field.

The Gosport School

The most arresting feature in the development of flying training in 1917 was the establishment in August of a school for special flying at Gosport. The creator of this school, which changed the training of fighting pilots in the Allied air services, was Major R. R. Smith-Barry, an officer of forceful personality. He had qualified for his Royal Aero Club certificate in November 1911, and had been granted a commission in the Royal Flying Corps in the following year. He went to France with No. 5 Squadron in August 1914, but was injured in a flying accident and, when he had recovered, served at home as an instructor and also as a night-flying pilot during Zeppelin raids. In July 1916 he took command, in

France, of No. 60 Squadron, at that time one of the few fighting squadrons in the Royal Flying Corps, in which he had served as a Flight Commander since its formation in April. He was back in England in December 1916, with experience of the development of air fighting on the Western front, and he was given command of No. 1 Reserve Squadron at Gosport.

It was while he commanded this training squadron that he developed his ideas. At that time mystery still surrounded the less usual movements of an aeroplane. It was known that if a pilot worked his controls in a particular way certain movements would, or should, follow, but the reasons were only vaguely understood, and there were few, even among instructors, who could give an explanation of the part played by the various controls at each stage of a particular manœuvre. If, therefore, anything unexpected happened, a pilot, especially before he became experienced, was apt to lose control, and it was often a matter of chance whether he could regain it.

Major Smith-Barry was greatly helped by the production of the Avro fitted with the 100 horse-power monosoupape engine. This aeroplane, which first appeared in the autumn of 1916, proved very suitable for every kind of manœuvre in the air. It was also of help that the problem of spinning had been solved. Up to the autumn of 1916 not many pilots who had the misfortune to get into a spin in the air had ever regained control. One exception was Major J. A. Chamier who, while in France, found himself spinning as he came from a cloud. While he was falling he recalled an incident on Salisbury Plain before the war when Lieutenant W. Parke, R.N., had recovered from a spin near the ground. When people had crowded round to congratulate Lieutenant Parke on his luck, he had explained that he had stopped spinning by doing 'everything wrong'. Major Chamier likewise did the opposite of what his experience as a pilot suggested and he also recovered. He subsequently related his adventure at Royal Flying Corps head-quarters. Whether any spinning experiments were made as a result there is no record. However that may be, it was about the

same time that Captain R. Balcombe-Brown,¹ a New Zealand pilot in No. 1 Squadron, appeared on the aerodrome of No. 60 Squadron in France, commanded by Major Smith-Barry, and said he had discovered how to get into a spin as well as out of one. 'I remember laughing', says Colonel Smith-Barry, 'and saying that a consciously-produced spin could not be the true article, and that 'a true spin had to be an act of God.' He, however, followed the directions given by Captain Balcombe-Brown, as did several other pilots of No. 60 Squadron, and quickly proved that a spin could be produced and continued at will.

No doubt other pilots were making a similar discovery about the same time. The manœuvre was also studied at the Royal Aircraft Factory at Farnborough, mainly by Dr. F. A. Lindemann. 'It was evident', says Dr. Lindemann, 'from the fact that spins sometimes continued 'over several thousand feet, that it was a comparatively 'stable form of flight, i.e., that the forces on the wings 'were balanced.' It was deduced that to recover from a spin it was essential to push the nose of the aeroplane down, and as the pilot would already be descending almost vertically, this action would be exactly against his instinct. To prove the mathematical deductions, Dr. Lindemann took his aeroplane into the air and made many spins, and he carried with him special instruments by which he could take readings to elucidate the exact movements.

The spin was not an act of God, but a simple manœuvre which could be explained, and explanation was the key-note of the Smith-Barry system. In the words of one of his instructors, 'the gospel he preached was that 'the aeroplane was a nice-tempered, reasonable machine 'that obeys a simple honest code of rules at all times and 'in any weather. And by shedding a flood of light on the 'mysteries of its control he drove away the fear and the 'real danger that existed for those who were flying aeroplanes in the blackest ignorance even of first principles.' The results attained by No. 1 Reserve Squadron soon

¹ Killed in combat in France, 2nd of May 1918.

became known, by report, throughout the Royal Flying Corps. Major-General J. M. Salmond, commanding the Training Division, who had given Major Smith-Barry an entirely free hand to develop his ideas, recommended that the squadron be developed as a School of Special Flying, and this was done in August 1917 when Nos. 27 and 55 Training Squadrons were added to make the establishment up to that of the newly created depot stations.¹ Chiefly the school was one for instructors, who were taught how to impart the methods of 'aerobatic' flying, and the influence of Gosport spread, therefore, throughout the Royal Flying Corps at home and overseas. In October 1917 a pamphlet, *General Methods of Teaching Scout Pilots*, embodying Lieutenant-Colonel Smith-Barry's teachings, was circulated. So far as the principles could be applied or adapted by local instructors, this was done, and the Gosport School therefore exerted a general influence on training long before Gosport-trained pilots had been distributed throughout the air services. The introductory matter in the pamphlet may be quoted as summarizing the change in ideas.

'This squadron has been temporarily transformed into 'a school for teaching the methods of instruction in flying 'which are set forth below. Some may think them hetero-'dox, but most, it is thought, will consider them quite 'normal, and indeed rather old-fashioned. The chief 'thing is dual control. Dual control has been employed 'here to teach every possible manœuvre, including flying 'in a wind, landing and getting off across wind, spinning, 'etc. The next and most important thing is that quite 'half the dual control that is given is administered after 'the pupil has gone off alone, as unless a learner has 'practised doing a given thing, such as turning a good deal, 'he will not appreciate the details that are shown him. In 'this way, bad habits are corrected before they have time 'to get fixed. The next thing is that as far as possible 'advanced pupils have been allowed to fly exactly as they 'chose, their experiments being limited only by the state

¹ The object of creating depot stations was to economize in personnel, transport, and in land for aerodromes.

'of their own nerve. This has not been found to increase
'the number of casualties. The instructors have been
'teaching always from the passenger's seat, so that the
'pupil has not had to experience an embarrassing change
'of seat either just before his first solo or at any other time.
'In this way the instructor has, of course, been deprived
'of instruments, but I take it that a flyer who could not
'do without instruments would have less to teach than
'to learn. The object in view throughout has been to
'teach pupils how to get out of all the various difficulties
'which one may get into in flying, by means of dual
'control. The object has been not to prevent flyers from
'getting into difficulties or dangers, but to show them how
'to get out of them satisfactorily, and having done so, to
'make them go and repeat the process alone. If the pupil
'considers this dangerous, let him find some other employ-
'ment as, whatever risks I ask him to run here, he will
'have to run a hundred times as much when he gets to
'France. How can a young officer be expected to do very
'much in France if, during the whole of his training in
'England, he has been told of nothing but what it is con-
'sidered dangerous to do in flying? As most of the sup-
'posed dangers are not dangerous at all, but both easy and
'pleasant, it would seem a simple matter for the pupil to
'be taught, chiefly by example, to be frightened of nothing
'connected with flying on this side of the lines.'

It was not until towards the end of 1917 that suitable telephones were devised to make conversation between the instructor and his pupil natural and easy. Up to the time when these telephones came to be fitted to the dual control aeroplanes, a series of simple hand signals, made by the instructor, passed orders or limited information to the pupil. If the instructor wished to talk more generally he would stall the aeroplane for a momentary conversation. 'This', says the pamphlet of the Gosport method, 'has given a useful indication of the state of the pupil's nerve, as those who are likely to prove unsuitable for scouts generally cling to the side with an unintelligent expression instead of conversing fluently and with confidence.'

The importance and value of the work done by

Lieutenant-Colonel Smith-Barry cannot be over-emphasized. Now that the things he taught are the commonplace of a pilot's training, it is, perhaps, a little difficult to realize that they were looked upon as revolutionary when they were introduced. Before the era of the Gosport school, the training of pilots in England fell short of the requirements of air warfare on the Western front. In too many instances, pilots had to complete their education on active service. It is true that the only real training for war is war, but the Gosport system, by raising the technical efficiency of pilots, and by giving them the confidence which came of conscious mastery of their aeroplanes, helped them to concentrate, on active service, on those things which contact with the enemy alone could teach.

Technical Instruction for Men

There were many changes in 1917 in the organization for training air mechanics. In January it was stated that engine fitters would be given a preliminary course of eight weeks at Coley Park, Reading, and would then pass to the Scottish School of Fitters at Edinburgh, or to the Central Flying School at Upavon, for a further course of eight weeks, after which they would be posted to a unit as fully trained. Within a month the system was modified. At the beginning of February instructions were issued that all fitters must first pass through one of the Polytechnic Schools, either at Regent Street (School of Preliminary Technical Training) or its branches, where they would receive eight weeks' tuition in the use of tools and in bench work. At the same time the administration was remodelled. Hitherto the schools for fitters at Edinburgh and at Upavon had been administered by the General Officer Commanding, Training Brigade, while the school at Coley Park came under the Commandant of the School of Military Aeronautics, Reading. On the 8th of February the three schools were amalgamated as the School of Technical Training (Men), Reading, which was placed directly under an Inspector of Technical Training in the department of the Director of Air Organization at the War Office. The inspector was also made generally responsible

for the system of instruction for fitters and riggers at the Polytechnic schools. The next step was to amalgamate the Polytechnic schools of preliminary training which were scattered throughout the country. This was done, by groups, from May onwards and was completed by October 1917. Concentration, although it made for efficiency in administration and for a general level of instruction, taxed the existing resources at Reading and, in July 1917, it was decided that the School of Technical Training (Men) should move from Reading to Halton Park, a move which took effect, officially, on the 10th of September, although instruction continued for a time to be given at Reading in a course now lasting sixteen weeks.

The Training of Observers

The progress in the training of air observers up to the end of 1916 has already been reviewed.¹ In December 1916 Major-General Trenchard, writing from France, stated that much time was being employed in teaching newly joined observers in the squadrons, and that because many of them were posted from the trenches without intermediate leave they were often not in a condition to take up work which demanded absolute mental and physical fitness. He therefore proposed to send home, for a course of training, all officers who joined the Royal Flying Corps in the field as probationary observers. He anticipated that when the scheme was working well about 100 officers would thus pass to England, and he suggested that they should be given a course of training lasting one month, after which they could be sent out again in weekly batches. The proposals were approved and became effective on the 1st of January 1917. It was arranged that seventy per cent. of the officers should be trained at the existing Schools of Military Aeronautics, and thirty per cent. at the School of Aerial Gunnery at Hythe. The curriculum for observers at the Schools of Military Aeronautics was laid down as follows:

Artillery work: Organization of the Royal Artillery in the field with the types of guns, howitzers, and

¹ Vol. III, pp. 298-9.

ammunition in use. Meaning of simple gunnery terms. Signal codes. Methods of aircraft co-operation. Practice with an artillery target.

Wireless. Sending and receiving morse. Elementary principles of wireless telegraphy as applied to aeroplanes. The transmitter and receiver and their care and maintenance.

Machine-guns. Care of the Lewis gun. Stripping and assembling. Stoppages. Filling the ammunition drum. General principles of aiming and firing.

Photography. Manipulation of service cameras. Taking photographs. Study of air photographs, particularly in connexion with artillery work.

Map Reading and Use of the Compass.

On the suggestion of Major-General Trenchard, officer observers of the corps reconnaissance squadrons became known as *corps observers*, those with fighter reconnaissance or bombing squadrons as *army observers*, and the non-commissioned officer machine-gunners in the two-seater squadrons as *aerial gunners*.

In March 1917 it was decided to give training to about 300 pilots and observers each month at the Wireless and Observers' School at Brooklands. At that time the school was mainly responsible for giving wireless instruction to officers, particularly to equipment officers, but it also gave some training to observers in artillery co-operation and in the use of the machine-gun. As a result of the decision to expand the observers' side of the school, Major J. A. Chamier, an officer experienced in the methods of co-operation with other arms, was brought home from France to take command, and he prepared a new curriculum for a course lasting one month during which ten hours were to be spent in the air.

Pupils from Brooklands were attached, in batches, to the 'Artillery Co-operation Squadron' at Netheravon¹ where they had opportunity to work with artillery in practice 'shoots'. In October the observer side of the school was

¹ In January 1917 the artillery co-operation Flights at the Central Flying School and at Lydd were organized as a Reserve Squadron with head-quarters at Netheravon.

given an independent existence and it moved to Hursley Park, Winchester, as the 'Artillery and Infantry Co-operation School'. Observers, after completing one month's training at the school, passed to Hythe for a two weeks' course in aerial gunnery.

In October 1917 there were important administrative changes. Sir David Henderson, the Director-General of Military Aeronautics, was relieved of his appointment in order that he might give his undivided energies to the details of the amalgamation of the naval and military air services as the Royal Air Force. He was succeeded on the 18th of October by Major-General J. M. Salmond who consequently became a member of the Army Council at the age of thirty-six, the youngest officer who had ever had a seat on that body. Major-General Salmond, an officer of tireless energy, had directed training at home from February 1916. His task had been, from some points of view, one of the most difficult of the war. At no time were conditions static and, working with such material as he was given or could obtain—always short of his requirements—he had to adapt and to improvise to meet demands arising from rapid expansion, from new methods of employment of aircraft, and from the air casualties consequent on the series of offensives conducted by the armies on the Western front. Although his outlook was essentially practical, he had shown himself responsive to new ideas and he had given a free hand and whole-hearted encouragement to those who earned his confidence. When Major-General Salmond went to the War Office he took with him, as Director of Air Organization, Brigadier-General G. Livingston, also aged thirty-six, who had been his chief staff officer in the Training Division. Major-General C. A. H. Longcroft¹ was brought home from France to take command of the Training Division with Brigadier-General J. G. Hearson as his chief staff officer.

The appointment of Deputy Director-General of Military Aeronautics at the War Office had been held,

¹ Major-General C. A. H. Longcroft had commanded the V Brigade, and his successor was Brigadier-General L. E. O. Charlton who had been Director of Air Organization at the War Office from February 1917.

since February 1917, by Major-General W. S. Brancker. In October this officer left to take command of the Royal Flying Corps in the Middle East, and, for a time, the appointment which he had held was not filled. On the 20th of November, however, Brigadier-General E. L. Ellington, who had been serving on the staff of the VIII Corps in France, was brought back to England to take up the appointment. This officer, who had been commissioned in the Royal Artillery in 1897, had learned to fly at Brooklands in 1912 when he was serving as a staff officer at the War Office. At the time he qualified for his Royal Aero Club certificate military aviation was dealt with at the War Office by a small committee, called the Royal Flying Corps Committee, under the chairmanship of Brigadier-General D. Henderson. Captain Ellington succeeded Major D. S. MacInnes as secretary of this committee in November 1912. In June 1913 the committee was dissolved and its work was taken over by a section of the newly formed Military Aeronautics Directorate, and of this section, which dealt with general air policy and administration, Captain Ellington took charge. In December 1913 he graduated at the Central Flying School, but he afterwards returned to the Artillery. In October 1914 he was given a staff appointment with the armies in the field and he continued to fill various army staff appointments in France and in England until November 1917, when he returned, once more, to the Royal Flying Corps. When, in January 1918, Major-General J. M. Salmond went to France to succeed Major-General H. M. Trenchard, who had been appointed Chief of the Air Staff on the newly formed Air Council, Brigadier-General Ellington became Director-General of Military Aeronautics, a post he held until the Royal Air Force came into being, officially, on the 1st of April 1918. He acted, in effect, as a liaison officer between the Army Council and the Air Council.

The Royal Naval Air Service, 1914–March 1918

On the outbreak of war, aeroplane and seaplane pilots for the Royal Naval Air Service were being trained at the Central Flying School at Upavon, and at the naval flying

school at Eastchurch, while airship pilots received instruction at Kingsnorth or Farnborough. To cope with the immediate expansion when war was declared, arrangements were made for naval pupils to undergo preliminary training at civilian schools of aviation, and an additional training Flight was attached to the defence Flight at Hendon. Skilled mechanics who entered from civilian life went to the naval depot at Sheerness, where they were fitted out with uniform and, if circumstances permitted, given a little drill before being posted direct to naval air units.

The Admiralty experienced no difficulty about the recruitment of pilots. Candidates were interviewed by a committee of senior naval officers who paid particular attention to their standard of education, their sporting accomplishments, and to their social and general qualifications. Because many more thousands offered themselves than could be taken, some who, otherwise qualified, were judged not fitted to receive commissions were offered appointments as warrant officers.

There was little change in the training system until September 1915, when, in consequence of a general reorganization of the Royal Naval Air Service, it was decided to centralize the training of pilots. Rear-Admiral C. L. Vaughan-Lee was appointed to the newly created post of Director of Air Services at the Admiralty and, at the same time, another post, that of Inspecting Captain of Air Training, was established and the appointment given to Wing Commander F. R. Scarlett. A scheme was at once prepared for the organization of a central training school where pupils could be taught to fly aeroplanes and non-rigid airships, and be given instruction in the handling of kite balloons. A site for the school was found at Cranwell which, it was stated, was capable of expansion in any direction, was well situated for feeding the principal air stations on the East Coast, and could be developed, when necessary, as a war station for rigid airships. Cranwell was opened on the 1st of April 1916, under the command of Commodore Godfrey M. Paine who was transferred from the Central Flying School

at Upavon.¹ About the same time the Naval Division vacated the Crystal Palace, which was promptly taken over by the Royal Naval Air Service to serve as a depot where newly entered officers and men could be given preliminary training in technical subjects and in discipline.²

The scheme of standardized training which came into force with the opening of Cranwell was briefly as follows. It was first laid down that 'on and after 1st of April 1916 'all officers under instruction in aeroplanes, kite balloons and airships are to graduate as pilots at Cranwell'. The various kinds of pilot were to qualify thus:

Aeroplane pilots. After a disciplinary course at the Crystal Palace, pupils were to be posted for preliminary flying training (20 to 24 hours solo) to the Schools at Eastchurch, Chingford, Eastbourne, or Redcar.³ They were then to pass on to Cranwell for advanced training in cross-country flying, navigation, engines, aerial gunnery, bomb-dropping, photography, and wireless telegraphy.

Seaplane pilots. Pupils were to pass from the training schools, as above, to the seaplane stations at Calshot, Felixstowe, or Killingholme. They were then to go on to Cranwell, where they were required to graduate in all subjects except flying.

Airship pilots and kite-balloon observers. Airship pilots, after preliminary training at the airship station at Wormwood Scrubs, were to pass to Cranwell, as were kite-balloon observers who had completed a preliminary course at Roehampton.

The question of the rank of pupil pilots who entered the Royal Naval Air Service was one which troubled the Admiralty from time to time. From the outbreak of war

¹ In January 1917 Commodore Godfrey Paine was appointed Fifth Sea Lord (for air) on the Board of Admiralty. He was succeeded at Cranwell by Commodore John Luce.

² The preliminary ground training of officer pupils was transferred from the Crystal Palace to the Royal Naval College, Greenwich, in the summer of 1917.

³ Eastbourne was opened in August 1914, Chingford in May 1915, and Redcar (originally as a home defence station) in July 1915.

they had been commissioned as probationary flight sub-lieutenants and they at once ranked with, but drew higher pay than, equivalent officers in the Royal Navy who had been long in the service. Furthermore, owing to the rapid expansion of the air service, many young pilots received rapid promotion to the rank of flight lieutenant which made the disparities in pay even greater. The Admiralty decided, therefore, to introduce what was popularly called the 'Midshipman' scheme by which pupils were to rank, on entry, as 'Probationary Flight Officers', and were to wear the uniform, with minor modifications, of a midshipman. The pay was not, however, to be affected, but was to continue at the rate of 10 shillings per day plus half flying pay, namely 4 shillings per day. Not until pupils had graduated at Cranwell were they to rank as Flight Sub-Lieutenants and to receive full flying pay. The scheme was approved by His Majesty by an order in Council dated the 18th of August 1916.

Meanwhile the Admiralty had in April 1916, on the opening of Cranwell, set up a committee of senior officers to reconsider the whole system of training in the Royal Naval Air Service. The most important of their recommendations, which were generally approved by the Admiralty in July, was that all matters relating to the training of pupils at the preliminary schools should be placed under the direction and supervision of the commanding officer at Cranwell. This was done by orders which took effect on the 1st of September, when Commodore Godfrey Paine assumed responsibility for the training of pilots at Cranwell, Eastbourne, Chingford, Eastchurch, Redcar, Windermere,¹ Calshot, and Vendôme (France). The appointment of Inspecting Captain of Air Training was no longer required and, on its abolition, Wing Commander H. D. Briggs, who had taken over the appointment from Wing Commander Scarlett in January 1916, and had been responsible for much of the reorganization of naval air training, was given command of the new school at Vendôme.

¹ Windermere, a civilian flying school, was taken over as a naval seaplane-training station in June 1916.

The Vendôme School, which became well known, owed its establishment to the unfavourable flying weather in England in the winter of 1915/1916. In March 1916 the Director of Air Services, on the suggestion of Wing Commander Briggs, had asked that the approval of the French Government should be sought for a Royal Naval Air Service aerodrome in a locality where favourable flying weather might be expected. The Board of Admiralty did not at once approve because the season of fine weather in England was approaching, but they requested that the matter should again be raised in July. Actually their approval was recorded at the end of June, and a suitable site was found near Vendôme, west of Orleans, on which work was begun in August, and the school was opened in November. The intention was that military as well as naval pilots should be trained at the school and, in return, the Royal Flying Corps undertook to train Royal Naval Air Service pilots, as required, at the schools in Egypt. From Vendôme naval pupils passed to Cranwell for graduation.¹

In September 1917 a statement of naval air requirements was, on the instructions of Sir Eric Geddes, the First Lord of the Admiralty, prepared to cover the period ending December 1918. The statement showed that 200 trained pilots would be required each month. At the time the paper was prepared the number of pilots graduating from Cranwell was stated to average 90 per month, but that an increase to 100 per month could shortly be expected. To meet the new requirements it was decided to establish two additional preliminary training schools and to make the existing school at Manston responsible, jointly with Cranwell, for advanced training.

About the same time the post of Inspecting Captain of Aircraft Training was revived and Captain H. D. Briggs, R.N., was relieved of the command of the school at Vendôme to take up the appointment. He became officially responsible for the direction of all training, and

¹ By agreement with the French Government a number of French naval air pilots were also trained at Vendôme as were, later, American pupils.

the commanding officer at Cranwell was now able to confine his attention, so far as concerned training, to Cranwell and its sub-station at Freiston.¹ He continued, however, to exercise disciplinary control over the schools at Chingford (with its sub-station at Fairlop), Eastbourne, and Redcar.

Naval air observers were trained at Eastchurch, where Captain J. M. Steel, R.N., was in command. The course lasted four months and the subjects included seamanship, wireless telegraphy, navigation, intelligence organization, bomb dropping, and aerial gunnery. Instruction was also given at Eastchurch to armament officers (sixteen weeks), armament instructors (twelve weeks), gun-layers (eight weeks), armourers (eight weeks), wireless telegraphy ratings (three weeks), and to engineer ratings for flying boats (two weeks).

On the 1st of April 1918, on the formation of the Royal Air Force, Captain Briggs ceased to be Inspecting Captain of Aircraft Training. He took command of Cranwell and the naval air training organization passed under the control of Brigadier-General J. G. Hearson, Director of Training in the new Air Ministry.

Fleet Air Officers

Such, in brief, was the general training organization for naval air personnel, but it will be necessary also to consider the special arrangements made to train officers for co-operation with the Fleet. In July 1916 Captain Oliver Swann, R.N., of the aircraft carrier *Campania*, had sought, and received, approval to develop the Scapa air station as a small training establishment where pilots and observers could be taught the methods of co-operation with the Fleet, and thus provide a reserve of officers for fleet work. No more than three additional seaplanes were asked for, and these were easily accommodated, but when

¹ A school to give advanced training to Cranwell pilots in air fighting and in bomb dropping had been opened at Freiston in September 1917. The site at Freiston had been in use as a bombing-ground for Cranwell pupils from the early summer of 1916.

in September the Commander-in-Chief requested that more seaplanes should be provided to enable reconnaissance patrols to be organized, it became necessary to choose another site for an air base because the accommodation at Scapa could not be expanded. As a result a new station was opened at Houton Bay in the summer of 1917 and, in addition to patrol work, gave training to pilots and observers in the work of co-operation with the Fleet. At the same time a base for kite balloons was established at Smoogroo, about midway between Houton Bay and Scapa, and a small aerodrome was laid out where reserve pilots and observers were instructed in aeroplane work with the fleet. Training in deck-flying was begun at the Isle of Grain, where a circular deck was constructed on the aerodrome. Later, the air station at East Fortune was employed for the training of aeroplane pilots attached to ships of the Battle Cruiser Fleet based at Rosyth.

THE ROYAL AIR FORCE, 1918

The first Air Council was formed in January 1918, and one of its tasks was to reorganize the training systems of the naval and military air services in consequence of their amalgamation. The guiding principle was that nothing should be done which might interfere with the supply of trained personnel to meet the needs of the fighting services.

In November 1917 the post of Inspector of Training, Training Division, had been created and the appointment had been given to Brigadier-General E. R. Ludlow-Hewitt who was transferred home from France. There followed many conferences between those responsible for directing training and, as a result, revisions in the existing syllabuses were made. It was realized that the schools of military aeronautics were attempting to teach too much, and artillery observation was therefore deleted from the syllabus of the schools and the time saved was given to instruction in engines and rigging. In April 1918 the subjects of aerial gunnery, and of synchronizing gears, were also deleted from the syllabus of each of the schools

of aeronautics.¹ Instead, cadets were posted, before going to a training squadron for flying instruction, to the Armament School at Uxbridge where the courses varied from one lasting thirteen days for bombing pilots to one of twenty-seven days for single-seater fighter pilots. The number of cadets who passed through the Armament School averaged, after April 1918, 1,200 per month.

Perhaps the most important of the efforts made to remodel the training system was the issue to all instructors of a comprehensive manual, dealing fully with the methods of *Flying Instruction*. This booklet, a model of its kind, was based on the principles developed at the Gosport School and, coupled with the other measures which were taken, sufficed to ensure, from the spring of 1918 onwards, when expansion was slowing down, that pupils received competent and adequate training.

There were some additions to the schools of aeronautics in 1918. The three existing schools in England at the end of 1917 were those at Reading, Oxford, and Denham. In January 1918 No. 6 School came into being at Bristol and No. 7 (Observers) School at Bath on the 24th of February. No. 8 began to form at Cheltenham on the 17th of July 1918, and on the 23rd of September 1918 authority was given to convert No. 7 Observers Cadet Wing into No. 9 (Observers) School of Aeronautics.

About November 1917 it was decided to convert the higher training squadrons into 'all through' squadrons where instructors would be able to keep pupils under their own charge during the whole course of their instruction in flying, that is, up to the time when they were ready for transfer to a finishing school or to be sent overseas. As higher training squadrons were transformed to give 'all through' training there was a decreasing need for the elementary squadrons, which were gradually dissolved.

On the formation of the Royal Air Force on the 1st of April 1918, the United Kingdom was divided into five Areas, each commanded by a Major-General, with head-

¹ When the Royal Air Force was formed on the 1st of April 1918 the word 'military' disappeared from the titles of the schools.

quarters at London, Salisbury, Birmingham, York, and Glasgow. At the Air Ministry a Directorate of Training, to deal with all questions of training policy, under Brigadier-General J. G. Hearson, came into being officially, although it had been working some little time. The Training Division was to be abolished as soon as the five area commands were fully ready to take over. The Areas were subdivided into operational, technical, and training groups and the last named were required to refer all training matters to the Director of Training at the Air Ministry. The Training Division was gradually dissolved by Brigadier-General Ludlow-Hewitt who commanded from the 1st of April to the 20th of May, when the division ceased to exist.

At the end of May the Air Council set up a committee to watch the question of accommodation, the lack of which had affected past estimates of output of trained personnel. The discussions and recommendations of the Training Expansion Committee, as it was called, covered a wide field and would have borne fruit had the war continued into the winter of 1918/1919.

Under the energetic direction of the Air Ministry the whole training system had been so reorganized that it was possible to issue in October 1918 a publication which set out the particulars for every type of training course in the Royal Air Force. The service student who has access to this book¹ will find it useful as giving the whole training system at home and the conditions of service as they existed at the end of the war. The full list of special schools at home administered by the Air Council at the time of the Armistice was as follows:

Schools of Aeronautics.

Reading	.	.	.	All types of officer pilots and observers.
Oxford,	}	.	.	All types of pilots except officers.
Denham,				
Bristol, and				
Cheltenham				
Bath	.	.	.	All types of observers.

¹ F.S. Publication 39.

Aerial Fighting Schools.

Turnberry . . .	Fighting scouts (officers and N.C.O.s). Two-seater fighter reconnaissance (officers and N.C.O.s). Two-seater fighter-reconnaissance observers (officers and N.C.O.s). Day bombers (officers and N.C.O.s).
Marske . . .	Do.
Sedgeford . . .	Do.
Freiston . . .	Fighting scouts (officers and N.C.O.s).
East Fortune . . .	Torpedo-plane pilots, fleet-reconnaissance and fighting scout for fleet work.

Schools of Navigation and Bomb-dropping.

Stonehenge . . .	Day-bomber pilots (officers and N.C.O.s). Day-bomber observers (officers and N.C.O.s). Night-bomber pilots. Night-bomber observers.
Andover . . .	Do.
Thetford . . .	Do.

Observers' Schools.

Hythe and New Romney . . .	Corps observers (officers and N.C.O.s). Day-bomber observers (officers and N.C.O.s). Two-seater fighter-reconnaissance observers (officers and N.C.O.s). Night-bomber observers.
Manston . . .	Army observers.
Eastchurch . . .	Fleet-reconnaissance and submarine-patrol observers (W/T observers (N.C.O.)).

*School for Marine Operation Pilots—Dover.**Ground Armament School.*

Uxbridge . . .	All types of pilot.
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W/T Telephony School.

Chattis Hill . . .	Two-seater fighter-reconnaissance pilots (officers and N.C.O.s). Two-seater fighter-reconnaissance observers (officers and N.C.O.s). Day-bomber pilots (officers and N.C.O.s). Day-bomber observers (officers and N.C.O.s).
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School of R.A.F. and Army Co-operation.

Winchester. (Worthy Down) . . .	Corps pilots and observers (officers).
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School of Photography, Map Reading, and Reconnaissance.

Farnborough . . . Two-seater fighter-reconnaissance observers
(officers).

Schools for Training Marine Observers.

Eastchurch . . . Fleet-reconnaissance and submarine-patrol
observers.

Aldeburgh . . . Anti-submarine patrol observers.

Balloon-training Depots.

Rochampton . . . Personnel working with Royal Navy.

Richmond Park . . . Personnel working with Army.

Balloon-training Base and Schools.

Sheerness . . . Personnel working with Royal Navy.

Lydd and Salisbury . . . Personnel working with Army.

Flying Instructors' Schools.

Gosport for SW. Area. Shoreham for SE. Area. Lilbourne for
Midland Area. Redcar for NE. Area. Ayr for NW. Area. Curragh
for Ireland.

The development of the home-flying training organization represented a series of striking efforts at improvisation. Those efforts, however, were not free from the disadvantages which improvisation must always entail, the chief of which, perhaps, is a not very lively regard for economy, whether of man-power or material. It so happened that training was begun in reserve squadrons, and it was perhaps inevitable that early expansion should tend towards a mere multiplication of training units. As the war progressed there were some notable attempts at concentration, such, for instance, as the amalgamation of squadrons to form training depot stations, but the many schools in England, for ground work as well as for flying, found no parallel in the French flying training system. In the autumn of 1917 Lieutenant-Colonel Smith-Barry paid a visit to France and investigated the French training organization. He reported that the French flying schools were few¹ and large. The head-quarters of each school was at a central aerodrome, where there were workshops equipped to effect major repairs, and, within a radius of a few miles, were five or six

¹ Eleven in October 1917, but the aim was to reduce them to five.

subsidiary aerodromes from which the instruction Flights (of 30 or 40 aeroplanes each) worked. The largest of the existing schools, at Avord, housed 721 training aeroplanes of which one quarter were in continuous flying use. What impressed Lieutenant-Colonel Smith-Barry, in particular, was the economy of man-power which the French system of concentration achieved. The statistics for the French schools showed that the number of men, skilled and unskilled, and of women, for each aeroplane kept in the air, varied between ten and eleven, whereas the comparable figure in England was about seventeen. On his return from France he recommended the establishment of similar large schools in England. His recommendations, which led to much discussion, were not adopted, the main reasons being, so far as can be judged, that the English system, which had developed on wholly different lines, was not adaptable to such drastic change without serious and perhaps prolonged loss of efficiency, and because the English country-side lacks the spaciousness of the plains of France so that areas suitable for such large-scale schools would have been hard to find.

PART II. EGYPT

In April 1916 the War Office decided to organize a training establishment for pilots in Egypt. The idea when the scheme began was that one hundred pupils should be under instruction at a time, and this, it was stated, would mean sending out three reserve squadrons. In order that training might be under way at the beginning of the cool weather, personnel were sent from England in July and August 1916, and the reserve squadrons came into being at the Royal Flying Corps camp at Abbassia (No. 21 on the 12th of July), and at Abu Qir (Nos. 22 and 23 on the 24th of August). Work was partly held up in the beginning because some of the experienced personnel, notably of No. 22 Reserve Squadron which had begun to arrive in Egypt on the 19th of July, were sent to help No. 14 Squadron during operations in the Canal zone. In September the three reserve squadrons were grouped to form the Twentieth (Reserve) Wing under Lieutenant-

Colonel A. G. Board who arrived at Abu Qir from England on the 15th of the month.¹ The pupils passed from elementary training in No. 21 Squadron to intermediate training in No. 22 and then on to No. 23 Squadron in which they graduated. Some of the pupils were sent back to England after they had completed fifteen hours' solo flying. Those who stayed in Egypt and qualified for their wings were employed to reinforce the air units in the Middle East Brigade.

What was to become (in November) No. 3 School of Military Aeronautics² began, in August 1916, as a Technical Training Class held in the ante-room of the officers' mess by Captain J. E. Dixon-Spain of No. 14 Squadron, and a few experienced non-commissioned officers and mechanics. Lectures and practical instruction were given on engines, rigging, and miscellaneous subjects. Examination papers of the kind set at the schools at Reading and Oxford were procured, and the first examination in Egypt was held on the 15th of September 1916, when 27 out of 31 pupils passed.

In December a fourth Reserve Squadron, No. 57, was formed at Ismailia from nucleus Flights trained by the Fifth Wing. Meanwhile waiting lists of applicants anxious to transfer to the Royal Flying Corps from other units of the Army had been compiled in Egypt, Salonika, Mesopotamia, and India, but as the training organization in Egypt got under way these lists were rapidly reduced, and the War Office was asked to supply pupils from England at the rate of sixty per month, beginning in January 1917. Because of a slowing down of training in England due to unsuitable weather on winter days, the War Office appreciated the advantages of the organization in Egypt, where the winter conditions were normally perfect for flying, and agreed to send pupils from home. It was again stipulated that when pupils, superfluous to requirements in the Middle East, should have completed

¹ Subsequent Commanders of the Twentieth Wing were Lieutenant-Colonel G. E. Todd and Lieutenant-Colonel H. le M. Brock.

² The School moved from Abbassia to the Heliopolis Palace Hotel in October 1917.

fifteen hours' solo flying they were to be sent home for final training.

In 1917 the training organization in Egypt expanded greatly, although there was recurring anxiety about the supply of pupils. Early in February an additional Reserve Squadron, No. 58, arrived at Suez from England, and in April a School of Aerial Gunnery was established from a nucleus of instructors who had arrived at Abu Qir from the gunnery school at Hythe in November of the previous year and had worked under the Twentieth (Reserve) Wing. Just when all was proceeding smoothly, however, there came the first of the man-power shocks when the supply of pupils from England was suddenly stopped. The reason given by the War Office was that the rate of expansion of training facilities at home had temporarily gone ahead of the rate of entry of pupil pilots, and Brigadier-General W. G. H. Salmond, the General Officer Commanding the Middle East Brigade, when informed of this decision, was told that he must meet his needs from the army in the Middle East. Cables were at once sent to the Commanders-in-Chief in Salonika, India, and Mesopotamia, but Brigadier-General Salmond pointed out to the War Office that time must elapse before arrangements to obtain pupils within the Middle East could become effective and that in the meantime there would be a shortage of pupils in the elementary training squadrons, a shortage which would later make itself felt in the advanced squadrons. He asked that the dispatch of 150 officer pupils, promised him from South Africa, should be expedited. He had 250 pupils in the Reserve Wing (on the 7th of May) and if the South African contingent arrived by the end of May his output would continue to be about 100 pilots per month for the next three or four months, but this output could be maintained only if pupils came forward at a higher rate to allow for failures.

The call which had been sent out to the various theatres of war for suitable officers to transfer to the Royal Flying Corps met with a good response, but it soon became clear that if the training system in Egypt was to be put to full use candidates for commissions must be accepted mainly

from among the rank and file, and in June, therefore, sanction was sought to establish a cadet squadron. There was an army school of instruction for cadets at Zeitoun, and a few pupils, earmarked for the Royal Flying Corps, had been sent there, but, apart from the fact that the preliminary training was different in some particulars from that given in the Cadet Wings of the Royal Flying Corps, the school was liable to be closed when active operations were in progress. Furthermore, the proportion of pilot cadets in the school could, in the circumstances, only be a small one. The Royal Flying Corps proposal was approved and the formation of No. 3 Cadet Wing, under Major A. P. Pargiter,¹ was begun. The preliminaries were many and it was not until October 1917 that the wing was in being at Heliopolis. The course was for a period of six weeks and the training was similar to that given at the Cadet Wings in England.

When in July 1917 the Government decided to double the Royal Flying Corps, the War Office was pleased, once again, to take advantage of the climate and organization in Egypt. In August the formation of an additional Training Wing—the Thirty-second, under Lieutenant-Colonel W. H. Primrose²—was sanctioned, to include five squadrons, made up from nucleus Flights to be provided by the existing reserve squadrons in Egypt. At the same time it was agreed that the training units in the neighbourhood of Cairo should be grouped, for administrative purposes, as a reserve wing, and in September there were three reserve wings as follows: the Thirty-eighth (Lieutenant-Colonel A. C. Boddam-Whetham)³ at Heliopolis, the Thirty-second at Ismailia, and the Twentieth at Abu Qir. The two last named each contained one elementary squadron and three higher training squadrons. The War Office said that pupils would be sent

¹ Subsequent Commanders were Major P. J. Whitty and Lieutenant-Colonel A. H. C. Kearsey.

² Subsequent Commanders were Major R. P. Willock (temporarily) and Lieutenant-Colonel S. Grant-Dalton.

³ Subsequent Commanders were Lieutenant-Colonel P. R. C. Groves, Lieutenant-Colonel W. H. Primrose, and Major A. W. Tedder.

to Egypt for training both from England and America, and that, subject to the requirements of the Middle East squadrons, they should be returned to England for final training when they had completed twenty-five hours solo flying. On the 1st of November the three training wings, together with No. 3 School of Military Aeronautics and No. 3 Cadet Wing, became a Training Group under Colonel P. L. W. Herbert, who came direct to Egypt from the command of a Training Group in England and was, therefore, conversant with the details of organization and with the latest methods of instruction in the Training Division at home.

About this time man-power problems were once more engaging the close attention of the authorities at home. In England one solution was the enlistment of women to replace able-bodied men in a variety of duties. In Egypt recourse was had, at the request of the War Office, to local labour. The Egyptians and other natives of the country were, it was said, quick to learn and, once they came to understand what was required of them, would, it was believed, be efficient. As a beginning, a number of natives were attached to each training squadron for instruction as carpenters, sailmakers, and blacksmiths. The experiment proved reasonably successful and the training of local labour was gradually extended to the trades of armourer, coppersmith, vulcanizer, photographer, and mechanical transport driver. In February 1918 War Office sanction was sought for the establishment at Abu Qir of a Base Depot to take local boys in the fifth year of their apprenticeship, and mechanics who could pass a trade test. It was proposed to staff the depot with British instructors from the Eastern Aircraft Factory,¹ but in order that apprentices might enter with some knowledge of the duties they would be required to do, it was also suggested that native instructors in the technical schools in Egypt should be given a special short course at the depot. The scheme for the formation of the Base Depot, which was ultimately approved by the Ministry of Education in Egypt and by the War Office, allowed for instruction to

¹ See p. 456.

400 Egyptians as a beginning with a gradual increase to 2,000.¹

Meanwhile in January 1918 Brigadier-General W. G. H. Salmond had pointed out, in a letter to the War Office, that a still greater training expansion on an economic basis was possible in Egypt. As soon as he had received his full complement of training aeroplanes it would be possible to produce 180 fully trained pilots each month. With an increase in the establishment of about 1,400 men the rate of output could be accelerated to 400 pilots each month, or, in other words, better returns would be obtained from expansion in Egypt within the existing organization than from new training schemes initiated elsewhere.² The War Office expressed interest and asked for further details, but nothing more was done until the end of February 1918, when Lieutenant-General J. C. Smuts, on behalf of the War Cabinet, visited Egypt to discuss with the Commander-in-Chief and his staff plans for a campaign against the Turks in Palestine. While the plans were being shaped the Royal Flying Corps was called upon to submit a full statement of its requirements. One result was that in March the War Office agreed that the number of squadrons with the Training Brigade³ in Egypt should be increased to twenty, by changing the existing squadrons into Training Depot Stations, each of a strength equal to three squadrons as in England. The mechanics who would be required were to be recruited in the Middle East Brigade and in South Africa. The Depot Stations began work as such on the 21st of July 1918. They were No. 16 Training Depot Station, formed from No. 194 Training Squadron, No. 20 from 193, 18 from 21, 17 from 57, and 19 from No. 195 Training Squadron. At the same time

¹ Lieutenant-Colonel C. Fraser, of the Middle East head-quarters air staff, who handled this question of Egyptian labour, has stated that some 1,200-1,500 native civilians came to be employed.

² For a table of the monthly output of pilots in Egypt in 1918 see Appendix X.

³ At the end of January 1918 the Royal Flying Corps in the Middle East was raised to the status of a division, with the Training Group as a Training Brigade. The Palestine Brigade was to be commanded by a Brigadier-General who was to have no duties west of the Canal.

a new Training Wing—the Sixty-ninth (Lieutenant-Colonel E. W. Powell)—was formed at Ismailia to take over two of the Depot Stations (17 at Abu-Sueir and 19 at El Rimal) and also No. 145 Squadron.

At the beginning of September the separate schools for gunnery and fighting were amalgamated to form No. 5 Fighting School, a recognition of the fact that fighting and gunnery were interdependent. About the same time a Flying Instructors' School was formed at El Khanka to give selected pilots training in the Gosport method, the aim being to teach them the sequence of instruction and the necessary 'patter' in order that they might themselves take over instruction in accordance with the latest methods developed in England. The school had resulted from a demand made by Egypt that flying instructors should be sent from England to overcome a shortage due to expansion of the training squadrons. The War Office could not meet this request, but sent out a commanding officer and two experienced instructors to form a school so that Egypt could train its own pilot instructors.

Other schools started in 1918 were: an Artillery Observation School at Almaza in January;¹ one for Navigation and Bomb-dropping (No. 3) at Almaza in May; and another to give instruction in Armament at Abbassia in the same month.

Repair and Supply Organization in Egypt

The original 'X' Aircraft Park, for service with the two squadrons (Nos. 14 and 17) sent to Egypt in 1915, left England in November of that year, under Captain C. H. Rowe, and settled down at Abbassia, Cairo. The squadrons in the Middle East, however, were soon operating as widely scattered detachments, and it became clear that this fact, together with general expansion, would necessitate special arrangements for repair and supply. In July 1916 the port depot at Alexandria, administered by the Park, was enlarged as 'X' Aircraft Depot and was made responsible for the issue of technical equipment and stores

¹ The School was originally called No. 197 Training Squadron which had begun work in August.

for all the Royal Flying Corps squadrons in the Middle East. Until the formation of the Base Depot (in July 1917) 'X' Aircraft Depot also dealt with reinforcements and with the training and trade testing of men transferred on probation in Egypt. When the Aircraft Depot was formed, 'X' Aircraft Park became a mobile park similar to those in France. It kept a specified number of aeroplanes, ready to fly, in what was known as its First Reserve, while aeroplanes under reconstruction were held in Second Reserve. To this reserve, aeroplanes crashed in the field, but repairable, were sent, a replacement going to the detachment from the Park's first reserve.

In January 1917 the Air Board considered a proposal put forward by Brigadier-General W. G. H. Salmond for the partial construction of aeroplanes in Egypt. Shipping space through the Mediterranean had to be strictly rationed, and because of this, and because also of loss due to submarine attacks on transports, the Royal Flying Corps in Egypt had to reckon with a shortage of aeroplanes. The suggestion had been made that one of the British manufacturers might be asked to establish a branch factory in Egypt, but it was recognized that this was impracticable because the essential raw materials were not locally available. As an alternative, Brigadier-General Salmond and his staff evolved the scheme for assembling aeroplanes, and for manufacturing certain aeroplane parts, in Egypt, and it was shown that an appreciable economy in the tonnage space allotted to the Royal Flying Corps could be achieved. The Air Board decided that every encouragement should be given to Brigadier-General Salmond and that he should have all the help available to make his ambitious scheme effective. By June 1917 work on the factory had begun at Abu Qir, and while the building was proceeding, personnel, including promising native mechanics, were selected and given training at 'X' Aircraft Park. There were delays in building and equipping the factory—called the Eastern Aircraft Factory—but in January 1918 it was opened under the command of Lieutenant-Colonel H. Burchell who had been closely associated with the scheme from its inception. The factory

was organized in separate sections for plane assembly, sail-making, fuselage assembly, erection and testing, inspection, stores, transport, engine overhaul, and for propellers. Statistics of the numbers of men engaged, and of the work done, are not available, but returns for part of the year, from July to November 1918, show that forty-eight aeroplanes were constructed at the factory.

Throughout 1918 also there was appreciable expansion in the depots and parks. 'X' Aircraft Park was incorporated in the Palestine Brigade and moved from Abbassia to Qantara in January. Its workshops and general premises at Abbassia were taken over by the Engine Repair Section which split away from 'X' Aircraft Depot at Abu Qir. At the same time the head-quarters and stores section¹ of the depot moved to Alexandria, leaving Abu Qir to the Aeroplane Repair Section. The formation of a Native Base Depot for training has already been dealt with. The Engine Repair Section ceased to be administered by 'X' Aircraft Depot in August and became two separate units under head-quarters, Middle East, with the title 'X' Engine Repair Depot, and 'X' Mechanical Transport Repair Section. At the same time the Aeroplane Repair Section, Salvage Section, and Wireless Repair Section at Abu Qir were grouped into an 'Acceptance, Workshop, and Salvage Park', with an independent head-quarters, but under the general administrative orders of 'X' Aircraft Depot. There was also an 'X' Balloon Repair Section. The Aircraft Parks in Macedonia, Mesopotamia, and India were additionally a responsibility of head-quarters, Middle East.

The shape of the air service in the Middle East during the war was moulded chiefly by Major-General W. G. H. Salmond. He had experience, vision, sane judgement, and great charm of manner, a combination of qualities which enabled him to get things done with the minimum of fuss. It was due to him that the scattered detachments of the Royal Flying Corps east of Malta enjoyed unity of command from the beginning. That command, extending from the Balkans to India, and embracing operations,

¹ A Stores Distributing Section was sanctioned in April 1918, and came into being at Ismailia later in the year.

training, repair, and construction, as well as the creation of new squadrons, was a remarkable one. Efficient administration of activities so dissimilar must be counted an achievement. The best tribute, however, to the personality of Major-General Salmond lies in the fact that the many and diverse air detachments in the Middle East were conscious of their unity and developed a corporate spirit of their own.

PART III. CANADA¹

Canada enjoyed two advantages over Egypt as a training centre; there were great numbers of young men well equipped to make excellent pilots, not only in Canada, but also in the United States, and supplies and material were available in almost unlimited quantities. A disadvantage was a less favourable winter climate. For a long time the source of supply of trained pilots was a small civilian school, financed by the Curtiss Company, at Long Branch, west of Toronto. Many Canadians passed through the Curtiss School, but the majority of those who joined the air services entered direct and received their training in England.

In the supply of suitable candidates the Admiralty enjoyed an advantage over the War Office in that candidates who presented themselves for the Royal Naval Air Service were, if found acceptable, immediately granted commissions as Probationary Flight Sub-Lieutenants. The Royal Flying Corps, on the other hand, did not grant commissions to pupils. They had to enter as cadets and they received their commissions only if found suitable after training. It was to the air that the young Canadians were attracted, and as they were not much concerned whether their horizon was one of water or land they did not hesitate, whenever they had the choice, to take the commission and let the cadetship go. The War Office was naturally critical of a system which inevitably deprived the Royal Flying Corps of an adequate share of the volun-

¹ For a detailed account of the war development of service aviation in Canada the reader may be referred to *Aviation in Canada, 1917-18*, by Lieutenant Alan Sullivan.

teers forthcoming, and from time to time the Army Council pointed out the need for closer co-operation between the two departments. No blame can be laid on the Admiralty, which knew what it wanted and saw that it got it, nor on the War Office, which could not give preferential treatment to Canadians. The fault lay with the system which placed the two departments in competition. The Admiralty sometimes found themselves with more commissioned pupils than could be absorbed in the naval air training organization. Writing, for instance, to Canada in April 1917, the Director of Air Organization at the War Office said: 'The R.N.A.S. are recruiting probationary 'flight officers¹ largely in Canada and a party of 62 arrived 'yesterday, of whom they could only absorb 40. I took 'on the remaining 22, and planted them at Reading with 'temporary commissions. Since then I heard this morning 'from Commodore Paine that another 124 are awaiting 'shipment in Canada, who also cannot be absorbed into 'the R.N.A.S. establishments and I said I would take the 'lot on the same terms. I hope the effect of this will not 'be to put our own cadets' "noses out of joint".'

Royal Flying Corps officers from England visited Canada from time to time to organize recruiting, but it was not until 1916 that a serious effort was made to take advantage of the resources of the Dominion in men and material. Lieutenant-Colonel C. J. Burke, who had visited Canada in the autumn of 1915, had urged, in a well-reasoned and far-sighted report, that a wing of the Royal Flying Corps should be established to train Canadian pilots. The suggestion, however, was rejected by the War Office, 'in consequence of the difficulties attendant 'on the permanent establishment in Canada of a school of 'instruction administered by the Royal Flying Corps'. The next move came from industrialists in Canada, who proposed to set up an aviation factory and school for which they sought the goodwill of the Ministry of Munitions. The project was referred in April 1916 to the Imperial Munitions Board in Canada. Members of the Board

¹ The rank of Probationary Flight Officer was introduced in August 1916.

thereupon visited the Curtiss stations at Toronto and Buffalo and learned that orders for aircraft had been placed with this American company by the British Admiralty to a total value of twelve million dollars.

The Board reported that there was no reason why an aviation industry should not be organized in Canada. Protracted negotiations then ensued, involving the Air Board, the War Office, the Admiralty, the Canadian Government, the Ministry of Munitions, and the Treasury. These various bodies, with their diverse interests in the scheme, found agreement difficult, and it was not until October 1916 that something definite began to emerge. The Ministry of Munitions was advised by cable in this month that 'the Dominion Government has 'now passed an Order in Council assenting to the scheme 'for an aeroplane factory and aviation school in Canada'. The proposal was that Canada should provide funds up to one million dollars to establish a Dominion Government aircraft factory on condition that the British authorities ordered aeroplanes to keep the factory going. The school, it was suggested, should be established by, and at the cost of, the British Government.

By this time the need of the War Office was one of urgency. At the end of September 1916 Major-General Trenchard had stated that, in view of the great increase in fighting in the air, it must be expected that his programmes of expansion would eventually entail doubling the number of fighting squadrons with each army in France. The Director of Air Organization had thereupon reviewed the whole position in a memorandum, and he produced a general programme which would necessitate an additional 35 reserve, or training, squadrons.¹ He suggested that some of them might be raised in Canada with a nucleus of officers and men sent from England. The main advantage would be a saving in the transport of training-type aeroplanes and engines across the Atlantic from the American factories, as well as of material for the air station buildings. Furthermore, if the proposal for an aviation factory in Canada was sanctioned, there

¹ Excluding two night-flying reserve squadrons.

would be a ready outlet for its aeroplanes. In the result, it was decided that twenty Reserve Squadrons should be raised and stationed in Canada, and that the idea of a separate school should be abandoned. Each reserve squadron was, in effect, a self-contained training school.

The scheme for a Canadian factory, as finally approved, aimed at establishing an aviation industry through private enterprise with Government financial backing, and with official supervision in the early stages. The Curtiss works and staff at Toronto were taken over by 'Canadian Aeroplanes, Limited', with capital provided by the Imperial Munitions Board whose Director of Aviation, Mr. F. W. Baillie, became the general manager of the factory. Included in the transfer to the newly formed Canadian Company were certain manufacturing rights, and a beginning was made with a building programme of 100 Curtiss aeroplanes for training.

It was decided that the squadrons to be formed in the Dominion should be known as Nos. 78 to 97 (Canadian) Reserve Squadrons, and that a nucleus Flight for each squadron should be sent to Canada from England. At the beginning of January 1917 a small party of officers, under the command of Lieutenant-Colonel C. G. Hoare, left for Toronto to start the new organization. When they arrived the country was deep under snow, and as the ground would not be visible until the end of March the question of deciding upon suitable aerodrome sites was difficult. The first site inspected was Borden Camp, fifty miles north-west of Toronto, which had previously been occupied by Canadian troops. The camp was five miles along a branch line from the railhead at Angus, but the line was closed and the Royal Flying Corps inspecting party made the journey on sleighs. The site was considered to be suitable and a contract was signed for clearing the ground and for the construction of additional buildings. Lieutenant-Colonel Hoare cabled to England asking for two of the nucleus Flights to be sent at once, with three more to follow in the middle of February. He anticipated that twenty aeroplanes would be delivered from the Toronto factory by the end of February and

that by the end of March he would have a total of eighty training aeroplanes from this and other sources. He decided to concentrate the squadrons in groups of five rather than distribute them. Meanwhile he arranged to attach cadets to the Officers' Training Corps of the Toronto University for preliminary drill, &c.

The first three nucleus Flights, bearing the titles Nos. 78, 79, and 81 (Canadian) Reserve Squadrons, left England on the 15th of February 1917, and a few days later Lieutenant-Colonel Hoare was able to report that he had received more than 1,000 applications for cadetships, so that he anticipated no difficulty so far as flying pupils were concerned, but he said that the recruitment of mechanics still proceeded very slowly. He was forming a Cadet Wing in which, he said, 'the training is, of course, very elementary, as I have not the instructors, but they will at least be drilled, do some signalling, a Lewis gun course, and as soon as I can get some old engines and machines together I can teach them something of engines and rigging'.

While the nucleus Flights were still on their way, flying training in Canada had begun. The sheds of the former Curtiss Company at Long Branch, Toronto, had been taken over, and the first aeroplane manufactured by Canadian Aeroplanes, Limited, had been delivered there on the 22nd of February. Within five days a nucleus Flight, called 'X' Squadron, beginning with three aeroplanes, had been established at Long Branch and instruction had started. The first pupils were making their solo flights on the 16th of March.

The three Flights from England reached Canada at the beginning of March, and by the 19th two more (Nos. 80 and 82) had arrived. By the end of March training at Borden Camp had started and by the middle of April the Reserve Squadrons Nos. 78, 79, 80, 81, and 82 were settled there.

The next site chosen was at Deseronto, 130 miles east of Toronto in the Bay of Quinte, and 'X' Squadron from Long Branch moved there on the 1st of May. By the end of the month, Nos. 83, 84, 86, and 87 nucleus Squadrons

had reached Deseronto from England, and, with the Long Branch unit, made the station establishment five squadrons. Four other Flights (Nos. 85, 88, 89, and 90) were also on the aerodrome waiting for the formation of a new base north of Toronto. This base was partly ready by the middle of June and No. 91 Squadron, direct from England, took up its station there on the 15th, followed by No. 90 on the 22nd, No. 88 on the 29th, 'Y' Squadron¹ on the 6th of July, and by No. 89 on the 13th.

Meanwhile on the 21st of March, the day the German offensive began in France, the War Office had cabled asking if Lieutenant-Colonel Hoare could dispense with the last five of the twenty nucleus Flights from England, and he had replied saying he would make do with fourteen from home and that he would make his own arrangements in Canada about the remainder. The War Office had also stated that it was desirable for Canada to complete higher training, 'including whole Training Brigade system of 'tests, gunnery, photography, aerial observation, &c.', and that instructors, equipment, and full training schedules would be sent out from England if Lieutenant-Colonel Hoare thought he could undertake the work. The reply from Canada said there would be no difficulty about higher training, and experts in photography, wireless, and gunnery were thereupon dispatched and had begun work at the end of April.

Before they arrived the War Office had again raised the question of expansion of the Canadian training scheme. Writing on the 31st of March the Director of Air Organization had said: 'I should like you now to push on as far 'as possible, and in keeping with the progress of your 'recruiting, equipment, and building, with a complete 'system of training identical, except for local adaptation, 'with that obtaining at home, i.e.

(a) A Cadet Wing on the lines of the Royal Flying 'Corps Cadet Wing at Denham. . . .

(b) A School of Military Aeronautics on the lines of 'Oxford. . . .

¹ 'Y' Squadron was one of the two ('X' was the other) which had been raised in Canada.

'I will start on this side earmarking for you technical instructors to meet your demands when they arise, which I expect will be very soon.' The staff of instructors for the School of Military Aeronautics arrived in Canada from England early in June and the School, No. 4, began its activities with 204 cadets on the 1st of July. It took over the existing Cadet Wing organization and a new Cadet Wing was thereupon formed at Toronto on the 11th of July, but did not begin an independent existence until the 23rd when it moved to Long Branch.

Texas

The entry of the United States of America into the war in April 1917 opened up new responsibilities as well as new opportunities for the Royal Flying Corps in Canada. America was anxious to take advantage of British experience and training in military aviation, and the Royal Flying Corps looked ahead, with questioning eyes, to winter sunshine in the southern states. There was also a hope that the unofficial avenues by which some of the fine human material in the United States entered the Royal Flying Corps as cadets might be widened.

Colonel Hoare visited Washington in June. He had already made arrangements for winter aerodromes on Lulu Island, near Vancouver, because he was anxious to avoid a long gap in training, especially in the first three months of the year when the severity of the Ontario climate might hold up instructional flying. Vancouver, however, was distant nearly five days by rail from Toronto, and although it enjoyed a mild climate, spring rains might go some way to counteract this advantage. There was the further trouble that the country surrounding the acceptable sites in Vancouver was mostly forest and not, therefore, too desirable for pupils who could not always be relied upon to land on their aerodrome. Although the sites had been chosen and work started on them, Colonel Hoare was anxious to replace the scheme by an aerodrome for winter flying in the United States. He found the American authorities keen and helpful and he, in turn,

was able to offer facilities which the Americans were grateful to accept. About the reciprocal agreement which they made there was a noticeable absence of bargaining. Each gave freely and generously, so far as was possible, what the other needed without any meticulous balancing of items.

The main results of the visit were as follows: A recruiting office for cadets for the Royal Flying Corps was opened in Fifth Avenue. The acceptance of American citizens was irregular, but if any presented themselves (and many did) they were not, if found suitable, discouraged.¹ Officially the United States Government undertook to provide aerodromes to accommodate ten Royal Flying Corps squadrons for winter training. Not only so, but they also undertook to buy 180 aeroplanes and sufficient spares from Canadian Aeroplanes, Limited, to maintain a full establishment of 180 aeroplanes on the winter aerodromes, and to make themselves responsible for petrol, oil, light, and power. The Royal Flying Corps, during the time it made use of this equipment, was to be responsible for necessary repairs and was to leave all material in good order on departure. The Royal Flying Corps, for its part, undertook the training of officers and personnel for ten American squadrons in Canada during the summer months.

Three aerodromes, called *Hicks*, *Everman*, and *Benbrook*, were selected in Texas. At the end of September 1917 an advanced head-quarters of the Royal Flying Corps was opened at Fort Worth, Texas. Five of the American squadrons which had been trained under the Royal Flying Corps in Canada moved to *Hicks* aerodrome in October. Also accommodated on this aerodrome was the School of Aerial Gunnery from Borden² which had an equipment of thirty aeroplanes and gave all gunnery instruction both to the American squadrons and to the British. The School completed one course at Borden

¹ The enlistment of American citizens into the Royal Flying Corps continued until January 1918 when it was stopped.

² This School had been formed by No. 80 Reserve Squadron at Borden Camp in June.

Camp in Canada on the 30th of October and began a new flying course in Texas on the 5th of November. *Everman* and *Benbrook* were occupied in the middle of November by the Forty-second and Forty-third Wings from Borden and Deseronto respectively.¹ These Wings had attached to them, for training, American officers and men who replaced the personnel at *Hicks* aerodrome when the American squadrons training there were judged qualified to go overseas. The first American squadron to leave Texas for England was No. 17 which departed on the 19th of December with 25 pilots and a full complement of ground officers and men. The pilots had passed the Royal Flying Corps tests and they continued their close association after they arrived in France on the 6th of February 1918, being attached, by Flights, to Royal Flying Corps fighting squadrons. Three more American squadrons (Nos. 22, 27, and 28) left Texas for overseas in January 1918, three (Nos. 139, 147, and 148) in February, and the remaining three in March, thus completing the ten for which the Royal Flying Corps in Canada had undertaken to provide initial training. The contingent at Texas moved back to Canada in April 1918.

Meanwhile training had also proceeded in Canada throughout the winter, under great difficulties, at the Forty-fourth Wing aerodrome at North Toronto. Flying was undertaken when the temperature was as low as 22° below zero. The aeroplanes were equipped with skis and some of the pilots had unexpected adventures. One, owing to engine failure, made a forced landing over two miles from his aerodrome and taxied (or skied) home across country and down the high roads.

A statistical summary was made to show what had been accomplished by the Royal Flying Corps in Canada up to the 26th of January 1918, the anniversary of the day

¹ The stations at Borden, Deseronto, and North Toronto were raised to the status of Wings in October, viz. Forty-second Wing (Borden), Nos. 78, 79, 81, and 82 Squadrons, and the School of Aerial Gunnery; Forty-third Wing (Deseronto), Nos. 80, 83, 84, 85, 86, and 87 Squadrons; and Forty-fourth Wing (North Toronto), Nos. 88, 89, 90, 91, and 92 (originally 'Y') Squadrons.

on which work had been begun at Toronto. The table of pilots reads as follows:

Trained and sent to England	744
Trained and awaiting transportation	83
Retained as instructors	138
Commissioned and killed during instruction	6
At recruits depot	348
At Cadet Wing	742
At No. 4 School of Military Aeronautics	753
At 42nd, 43rd, and 44th Wings	843
At School of Aerial Gunnery	154
Discharges	197
Cadets, fatal accidents	28
	Total 4,036

Throughout 1918 Canada sent to England an average of rather more than 200 trained pilots each month and, in addition, supplied a few hundred cadets who had passed the course at the Cadet Wing and the School of Aeronautics, but had been given no flying instruction.¹ At the time of the Armistice the full organization of the Royal Air Force in Canada comprised, in addition to the three training wings, another of five squadrons in process of formation, a Cadet Wing, a School of Aerial Fighting, made up of four squadrons (formerly called the School of Aerial Gunnery), No. 4 School of Aeronautics, separate Schools for Armament, Special Flying,² and Artillery Co-operation, a Recruits Depot, Engine and Aeroplane Repair Parks, a Stores Depot, and a Mechanical Transport Section.

Any account of the training developments in Canada, no matter how brief, must take note of the help given by institutions and by individuals. Prominent citizens in the various towns formed voluntary committees to handle recruitment; presentations, ranging from aeroplanes to

¹ The cost of training a pilot in Canada worked out at \$9,835. (See *Aviation in Canada, 1917-18*, by Lieutenant Alan Sullivan.) Calculations made in April 1918 for the training organization in England showed that the cost of each pilot being produced at home at that time was £1,030. The sum of £1,000 was proposed to the American Government in respect of the cost of training an American cadet in Royal Air Force squadrons in England.

² The Gosport method.

books, were made to the Brigade; facilities of many kinds were placed at its disposal, and there was generous provision, whether of material or service, for whatever appertained to the well-being of officers and men during the time of their service in Canada.

This summary review of training developments in the war tells a story of fine endeavour and of many excursions, often remarkable, into the prodigal fields of improvisation. It does not, however, tell the whole story and it will be necessary to make reference to the inadequacy of the training given in certain instances. There were times when the production of pilots was accelerated to meet requirements of the Western front, and pupils were pushed along in such a way that many of them were sent to France with little more than an elementary knowledge of flying. The tragedy of this lay in the fact that it was the most promising pilots who were thus picked out and plunged into the stern realities of Western front warfare before they were properly equipped to sustain themselves in the air. There is little doubt that the air casualties in France, particularly on the Somme in 1916 subsequent to the arrival of the new German fighters in September, took the authorities at home by surprise. At an Air Board meeting early in December 1916, when there was discussion about additional naval fighting squadrons being placed at the disposal of the Commander-in-Chief in France, Rear-Admiral Tudor, the naval member of the Board, asked Major-General Trenchard, who attended the meeting, whether, if the Navy provided more squadrons, the Royal Flying Corps would be enabled to give its pilots longer training. It was his impression, he said, that the casualties among military pilots were partly due to the shortness of their training. Major-General Trenchard did not agree that the losses were due to the inexperience of pilots except, perhaps, on long-distance work, while Major-General Henderson stated that the shortness of training was a consequence of the number of casualties, not the reverse.

These statements call for some comment. If the reader

turns back to Volume II he will find¹ an account of the formation of Boelcke's *Jagdstaffel* on the Somme at the end of August 1916, and of its subsequent influence on the air position on the Western front. He will be reminded that not only did the aeroplanes with which Boelcke's unit was equipped outclass the contemporary British aeroplanes opposed to them, but that the German pilots were experienced and carefully selected, and that they had been given special additional courses of training at single-seater fighting schools. In the light of this knowledge, hidden at the time, it must be admitted that the Royal Flying Corps pilots, except those who had been flying on the Western front for some time, were by comparison inexperienced. The statement of Major-General Henderson is illuminating because it reveals what is undoubtedly true, that the trouble was begun by the unexpectedness of the casualties. It was then accentuated by the fact that training was hastened, while the arrival in France of British fighters capable of standing up to the German aeroplanes was delayed until the battles of 1917 began. The heaviest casualties suffered by the Royal Flying Corps in the war occurred in March and April 1917, and they continued on such a scale throughout most of the year that the training facilities did not catch up with Western front requirements until the year was well spent, and then it was that, although new pilots who arrived in France were comparatively much better trained than at any previous period of the war, they were not, as human material, up to the general standard of their predecessors.² In a memorandum prepared for the War Cabinet in June 1917 Major-General Henderson stated: 'The actual requirements in pilots are very largely governed 'by the casualties. Wastage from all causes has hitherto 'been so great that, although we have succeeded in increasing the strength considerably, yet we have never been able 'to give pilots as much training as would be desirable.'

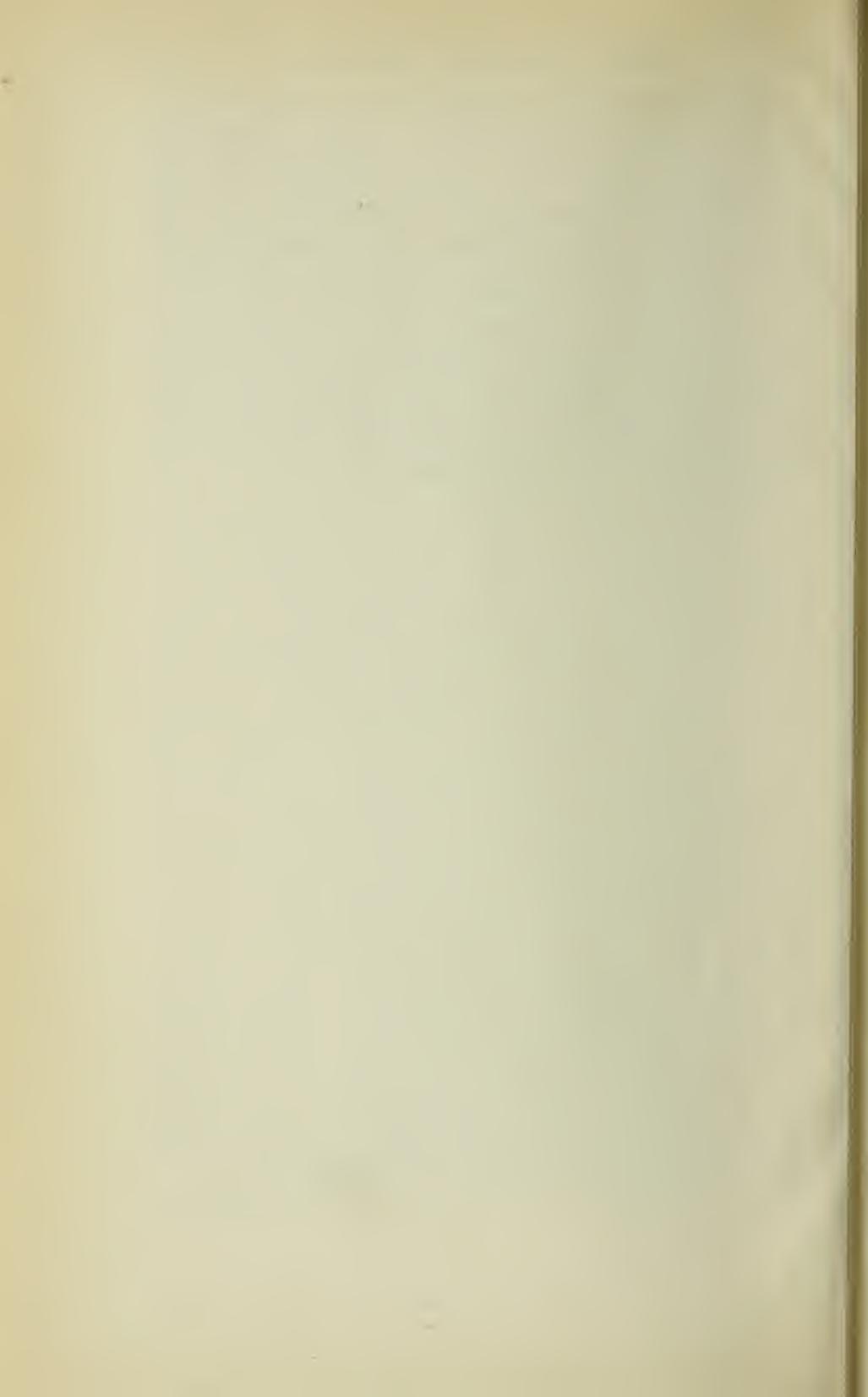
¹ p. 281 et seq.

² In April 1917 pilots were going overseas after an average of 17·5 hours' instruction in the air: by September 1917 the average time in the air had increased to 48·5 hours per pilot.

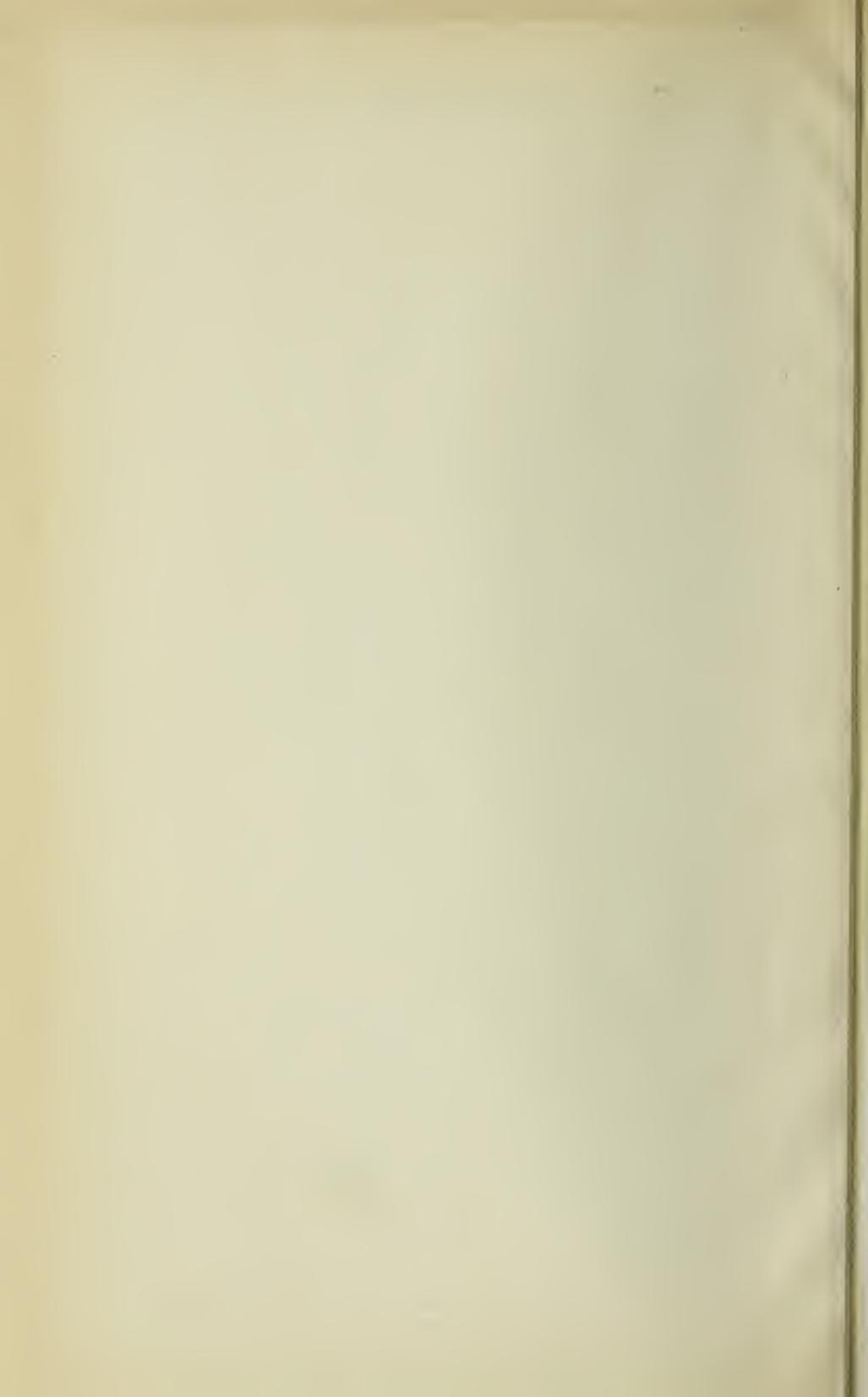
It is important to seek further explanation of the conditions under which the Royal Flying Corps worked in 1917. It cannot be said that there was any lack of provision in the field. In June 1916, before the Somme battle began, Sir Douglas Haig, on the initiative of Major-General Trenchard, put forward a programme of expansion for the Royal Flying Corps which asked for a total of 56 service squadrons for the Western front by the early spring of 1917. This new programme raised the total of service squadrons for all theatres of war to eighty-six. On the calculations of the War Office, the maintenance of this number of service squadrons would require a total of sixty reserve or training squadrons. These calculations, which were based on past experience, were too low, and in any case the Army Council, faced with a serious dearth of technical man-power, failed to approve the full increase.¹ Sanction was given for only one-half of the proposed expansion, and it was stated that the whole subject would be reviewed in October 1916. This provisional sanction covered fifty instead of sixty reserve squadrons. It is of interest that the War Office calculations were based on a wastage of pilots at the rate of 230 per cent. per annum for all squadrons. The average wastage during the Somme battle was at the rate of 300 per cent. although it was nearer 400 per cent. for the period subsequent to the arrival of the new German fighters in September. It is a further commentary on the difficulties of forecast that in the month of April 1917, when the battle of Arras was fought, the wastage in France of pilots was at the rate of 600 per cent. per annum. It may be remarked, incidentally, that these facts and figures emphasize the importance of reserves, and of industrial organization for immediate and continuous output, in any assessment of air strength. It is a modern fashion to speak in terms of first-line aeroplanes, but such measurements may be misleading unless it is realized that in war first-line aeroplanes might suffice only for a sharply diminishing offensive between, say, one moon and the next.

¹ See also Vol. III, pp. 289-92. The question of man-power will be dealt with in Vol. VI.

Whether or not the air casualties on the Western front would have been fewer had the policy which directed the employment of the squadrons been different, is a matter which may be argued. From a consideration of German official statistics supplied by the *Reichsarchiv*, it would appear that the offensive which was relentlessly pursued in the air by the British air service was about four times more costly than the defensive policy adopted by the Germans. This is not the place for a final statement about the respective policies. On their merits and demerits much has already been written, but they deserve, and will receive in the final volume of this history, careful review; and until the reader has the fuller facts before him he would do well to suspend judgement.



APPENDICES



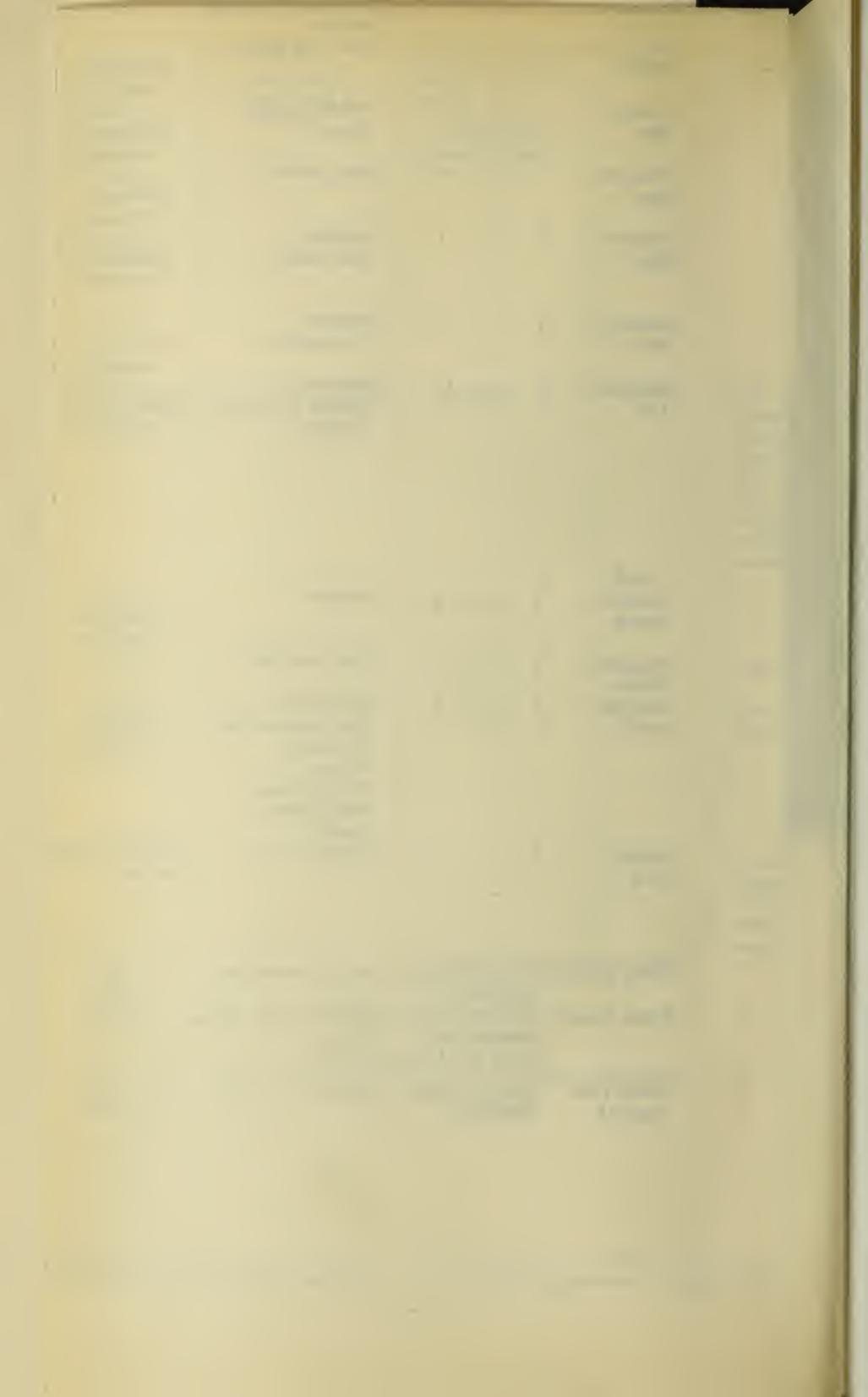
APPENDIX I

STATISTICS OF GERMAN AIR RAIDS ON GREAT BRITAIN, 1917-18

TABLE 'A'—AIRSHIP RAIDS

Date.	Number of enemy airships which:		Locality (in general where bombs were dropped).	Total bombs dropped. (British estimate: proportion on London M.P.D.* in brackets).		Total casualties (London M.P.D.* in brackets).		Total estimated monetary damage.	No. of defence aircraft which ascended in Great Britain.	Remarks.	See pp.
	Started.	Crossed British Coast.		Number.	Weight (in lb.)	Killed.	Injured.				
1917											
17th Feb.	1	1	No bombs dropped on land.	..	..	..	..	..	..		7
16th/17th March	5	4	Kent, East Sussex.	79 (includes 33 incendiary).	9,620	..	..	£163	16	L.39 destroyed by gun-fire near Compiègne, France. One defence aeroplane crashed, pilot killed.	8-11
23rd/24th May	6	5	Norfolk, Suffolk, Essex.	60 (includes 25 incendiary).	4,548	1	..	£599	72	A Short seaplane failed to return, but six days later seaplane and crew picked up in the sea. One defence seaplane missing, pilot missing.	12-14
16th/17th June	4	2	Kent, Suffolk.	41 (includes 4 incendiary).	5,954	3	16	£28,159	29	L.48 destroyed by Second Lieutenant L. P. Watkins at Theberton, Suffolk.	32-4
21st/22nd Aug.	8	1	Yorkshire, East Riding.	29 (includes 13 incendiary).	2,123	..	1	£2,272	20 (includes large America Sea-plane).	Two defence aeroplanes crashed, one pilot injured.	54-6
24th/25th Sept.	11	5	Yorkshire, Lincolnshire.	107 (includes 18 incendiary).	11,081	..	3	£2,210	35	Four defence aeroplanes crashed, one missing. One observer killed, one pilot wounded, one pilot and one observer missing.	79-82
19th/20th Oct.	11	11	Midlands, Eastern Counties, London.	275 (20) (includes 79 (13) incendiary).	30,621 (2,454)	36 (33)	55 (50)	£54,346	73	L.44 destroyed by gun-fire near Lunéville, France. L.45 destroyed by crew after forced landing at Sisteron, France. L.49 made a forced landing near Bourbonne-les-Bains, France. L.50 also landed near Bourbonne-les-Bains, France. Ship rose with four men on board and apparently foundered in Mediterranean Sea. L.55 wrecked at Tiefenort, Germany. Six defence aeroplanes crashed, one pilot killed.	92-102
1918											
12th/13th March	5	3	Yorkshire.	49 (includes 12 incendiary).	6,285	1	..	£3,474	10		121-2
13th/14th March	3	1	West Hartlepool.	21	2,316	8	39	£14,280	15	Two defence aeroplanes crashed, one pilot killed.	122-3
12th/13th April	5	5	Lincolnshire, Northamptonshire, Lancashire, Wigan, Warwickshire, Birmingham, Norfolk.	141 (includes 41 incendiary).	21,527	7	20	£11,673	20	Two defence aeroplanes crashed, one pilot injured, one pilot wounded.	123-6
5th/6th Aug.	5	2	Norfolk Coast.	No bombs dropped on land.	..	..	..	..	..	L.70 destroyed by Major E. Cadbury (pilot) and Captain R. Leckie (observer) off Wells-next-the-Sea. One defence aeroplane crashed, two missing. One pilot killed, two pilots missing, one observer missing.	131-4
Total, 1917-18. (No. of raids in which bombs were dropped, 9.)				802 (20)	94,075 (2,454)	56 (33)	134 (50)	£117,176			
Total, 1914-16. (No. of raids in which bombs were dropped, 42.) From Vol. III, App. III (A).				5,004 (726)	345,925 (52,844)	501 (150)	1,224 (466)	£1,410,409			
Grand Total, 1914-18. (For 51 raids in which bombs were dropped.)				5,806 (746)	440,000 = 196 tons 8 cwt. 64 lbs. (55,298 = 24 tons 13 cwt. 82 lb.)	557 (183)	1,358 (510)	£1,527,585			

* Note. 'M.P.D.' refers to the Metropolitan Police District which covers an area within a radius of approximately 15 miles from Charing Cross.

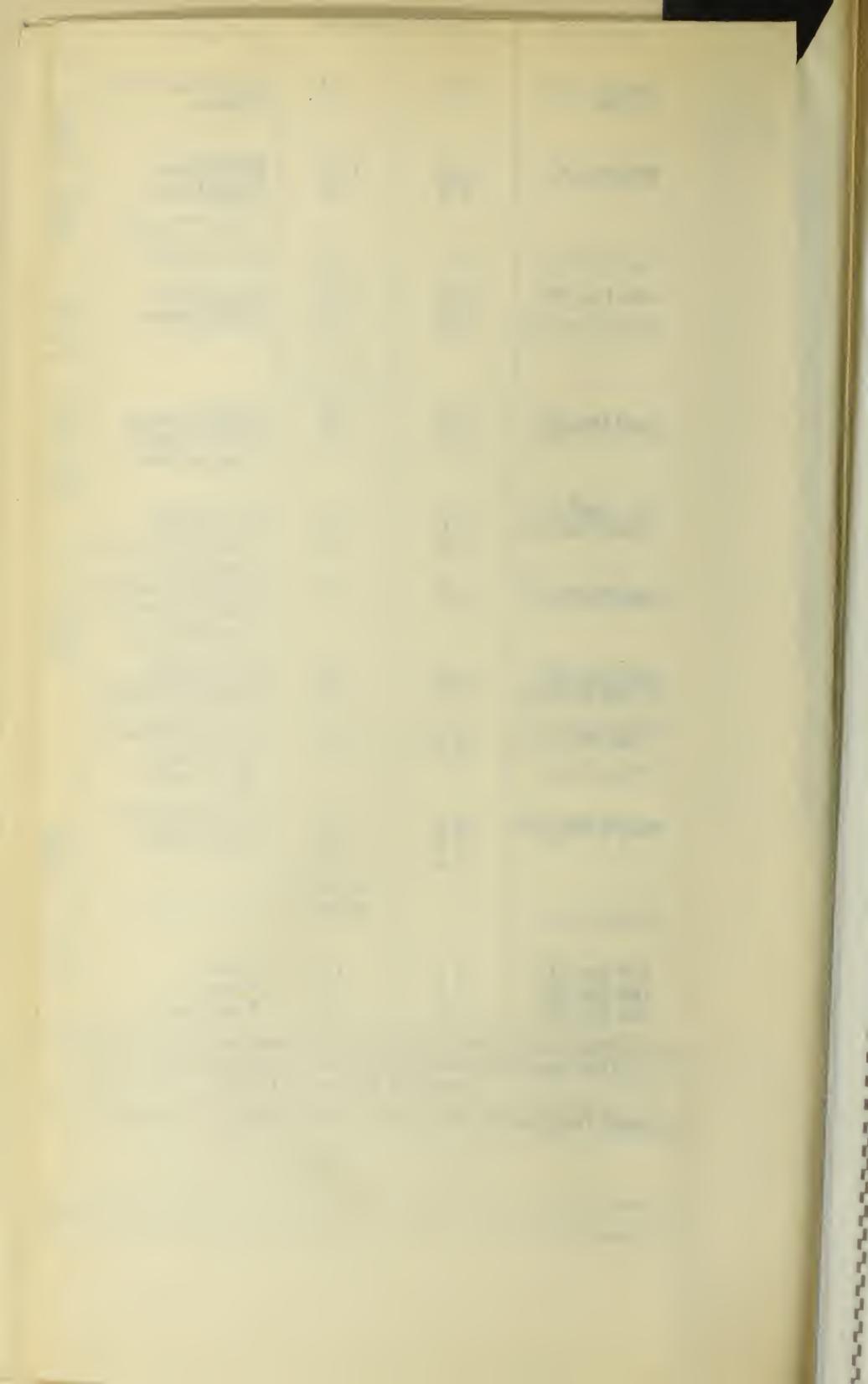


APPENDIX I

TABLE 'B'—AEROPLANE RAIDS, 1917-18

Date (N = Night) (D = Day).	Number of enemy aeroplanes		Locality (in general where bombs were dropped).	Total bombs dropped (British estimate: proportion on London M.P.D.* in brackets).		Total casualties (London M.P.D.* in brackets).		Total estimated monetary damage.	No. of defence aircraft which ascended in Great Britain.	Remarks.	See pp.
	Started (G = Gotha R = Giant C = Smaller type).	Crossed British Coast.		Number.	Weight (in lb.).	Killed.	Injured.				
1917											
14th Feb. (D)	1 C	1 C	Deal.	No bombs dropped.		..	..	..	..	..	..
1st March (D)	1 C	1 C	Broadstairs.	9	239	..	6	£700	23	..	18
16th March (N)	1 C	1 C	Margate, Westgate.	21	556	..	..	£45	7	..	18
17th March (D)	1 C	1 C	Dover.	5	116	..	..	..	2	..	18
				(includes 1 incendiary).							
5th April (N)	1 (seaplane)	1 (seaplane)	Kent, Ramsgate.	8	212	..	..	£4	..	..	18
6/7th May (N)	1 C	1 C	London.	5 (5)	133 (133)	1 (1)	2 (2)	£510	4	..	18
25th May (D)	23 G	21 G	Kent, Folkestone.	163	9,257	95	195	£19,405	74	One enemy aeroplane crashed in Belgium, one destroyed in combat by R.N.A.S. Dunkirk.	20-2
5th June (D)	22 G	22 G	Essex, Kent.	74	6,818	13	34	£5,003	66	One enemy aeroplane destroyed by A.A. fire.	25
13th June (D)	22 G	18 G	Kent, Margate, Essex, London.	128 (118)	8,984 (8,771)	162 (162)	432 (426)	£129,498	92	One British observer killed in combat.	26-8
4th July (D)	25 G	18 G	Harwich district.	65	2,536	17	30	£2,065	83	One British observer killed in combat.	34-6
				(23 dropped in sea—weight not known).							
7th July (D)	24 G	22 G	Margate, London.	76 (73)	6,929 (6,598)	57 (54)	193 (190)	£205,622	95	Four enemy aeroplanes crashed on landing. One enemy aeroplane destroyed in combat. Two defence aeroplanes destroyed. British casualties, two pilots killed, one wounded, one observer wounded.	36-8
22nd July (D)	23 G	22 G	Harwich district.	55	3,123	13	26	£2,780	121	One enemy aeroplane shot down in the sea north of Ostend.	51-2
				(13 dropped in sea—weight not known).							
12th Aug. (D)	13 G	10 G	Essex, Southend, Kent, Margate.	37	3,828	32	46	£9,600	133	Four enemy aeroplanes crashed on landing. One made a forced landing at Zeebrugge. One destroyed in combat.	52-3
				(7 dropped in sea—weight not known).							
22nd Aug. (D)	15 G	11 G	Kent, Margate, Ramsgate, Dover.	50	4,508	12	27	£17,145	137	Two enemy aeroplanes destroyed by A.A. fire, one destroyed in combat.	57-8
2nd Sept. (N)	2	2	Dover.	14	804	1	10	£3,486	..	Type of raiding aircraft uncertain.	60
				(see remarks column)							
3rd/4th Sept. (N)	5 G	4 G	Kent, Margate, Clatbam, Sheerness.	46	2,391	132	96	£3,993	16	..	60-2
4/5th Sept. (N)	11 G	9 G	East Suffolk, Essex, Kent, Dover, Margate, London.	90 (57)	5,998 (3,520)	19 (16)	71 (56)	£46,047	18	One enemy aeroplane missing.	62-4
				(at least 3 dropped in sea—weight not known).							
24th Sept. (N)	16 G	16 G	Kent, Dover, Essex, London.	118 (30)	6,870 (1,529)	21 (14)	70 (49)	£39,818	30	One enemy aeroplane crashed in Belgium.	78-9
				(includes 47 (17) incendiary bombs).							
25th Sept. (N)	15 G	15 G	Kent, London.	60 (26)	3,922 (961)	9 (9)	23 (22)	£16,394	20	One enemy aeroplane missing.	82-3
				(includes 21 (19) incendiary bombs).							
28th Sept. (N)	25 G 2 R	18 G 2 R	Kent, Essex, East Suffolk.	45	2,683	..	..	£129	20	Number of raiding aeroplanes which crossed the coast uncertain. Three enemy aeroplanes destroyed by A.A. fire. Six wrecked on landing in Belgium.	83-4
				(includes 1 incendiary bomb).							
29/30th Sept. (N)	7 G 3 R	7 G 3 R	Kent, Essex, London.	55 (25)	4,539 (1,902)	14 (13)	87 (86)	£23,154	30	One enemy aeroplane destroyed by A.A. fire, one landed in Holland.	84
				(includes 1 (1) incendiary bomb).							
30th Sept. (N)	11 G 1 C	10 G 1 C	Kent, Margate, Dover, Rochester, Essex, Southend, London.	92 (43)	4,823 (2,868)	14 (3)	38 (31)	£21,482	33	One enemy aeroplane crashed owing to engine trouble.	85-6
				(includes 38 (17) incendiary bombs).							
1st Oct. (N)	18 G	18 G	Kent, Essex, London.	81 (28)	5,114 (2,585)	11 (11)	42 (41)	£45,570	18	..	88-9
				(includes 18 incendiary bombs).							
29th Oct. (N)	3 G	1 G	Essex.	8	547	..	..	..	6	Of the three enemy aeroplanes which started, two dropped their bombs on Calais.	102-3
				(see remarks column)							
31st Oct. (N)	2	2	Kent, Dover.	16	1,010	..	..	£2	..	Type of raiding aircraft uncertain.	103
				(6 dropped in sea—weight not known).							
31st Oct./1st Nov.	22 G	22 G	Kent, Thanet, Essex, London.	274 (85)	7,944 (2,907)	10 (9)	22 (19)	£22,822	50	One enemy aeroplane caught fire and destroyed on landing. Four crashed and wrecked in Belgium.	103
				(includes 181 (48) incendiary bombs).							
6th Dec. (N)	19 G 2 R	16 G 2 R	Kent, Thanet, Essex, London.	423 (276)	7,170 (3,863)	8 (3)	28 (15)	£103,408	34	Two enemy aeroplanes forced to land in England owing to A.A. fire and destroyed. Two made a forced landing in Belgium as a result of A.A. fire. One crashed on landing. One missing.	103-4
				(includes 395 (267) incendiary bombs).							
18th Dec. (N)	15 G 1 R	15 G 1 R	Kent, Thanet, Essex, London.	145 (89)	8,153 (4,392)	14 (13)	83 (79)	£238,861	47	One enemy aeroplane destroyed in combat. One destroyed by A.A. fire. Two destroyed by fire on landing. Two damaged by forced landings and two damaged in landing on aerodrome.	105-6
				(includes 51 (47) incendiary bombs).							
22nd Dec. (N)	1 G 2 R	1 G 2 R	Westgate, Broadstairs, Ramsgate, Margate, Deal.	No bombs on land (bombs in sea—weight not known).		..	..	..	18	One enemy aeroplane landed at Margate, and destroyed.	109
1918											
28/29th Jan. (N)	13 G 1 R	7 G 1 R	Kent, Margate, Ramsgate, Sheerness, Essex, London.	62 (44)	6,633 (4,646)	67 (65)	166 (159)	£187,350	97	One enemy aeroplane destroyed in combat. Four damaged on landing.	113-16
29/30th Jan. (N)	4 R	3 R	Kent, Essex, London (outside County of London area).	74 (54)	6,169 (3,964)	10 (10)	10 (10)	£8,968	75	..	116-17
				(includes 19 (19) incendiary bombs).							
16th Feb. (N)	5 R	5 R	Kent, London.	29 (11)	5,292 (3,308)	12 (12)	6 (6)	£19,264	60	..	117-18
17/18th Feb. (N)	1 R	1 R	London (County of).	19 (19)	2,011 (2,011)	21 (21)	32 (32)	£38,922	69	One defence aeroplane destroyed, pilot killed.	118-19
7/8th Mar. (N)	6 R	5 R	Essex, Bedfordshire, Hertfordshire, Kent, London.	35 (17)	6,736 (4,421)	23 (23)	39 (39)	£42,655	42	Two enemy aeroplanes badly damaged by forced landings on return. Three defence aircraft crashed on landing—two pilots killed.	119-20
19/20th May (N)	38 G 2 C 3 R	38 G 2 C 3 R	Essex, Southend, Kent, London.	157 (72)	23,724 (12,128)	49 (48)	177 (172)	£177,317	84	Number of raiding aeroplanes which crossed coast uncertain. Three enemy aeroplanes destroyed in combat, three destroyed by A.A. fire, one forced to land owing to engine failure, and one crashed in Belgium on return.	127-30
				(includes 2 incendiary bombs).							
17th June (D)											
18th July (D)											
20th July (D)											
				Daylight reconnaissance, no bombs dropped.		..	..	..	35	..	130
				Do.		..	..	..	2	..	130
				Do.		..	..	..	49	..	130
Total 1917-18. (No. of raids in which bombs were dropped, 33.)				2,539 (1,072)	159,772 (70,510)	837 (487)	1,991 (1,434)	£1,423,019	..	..	..
Total 1914-16. (No. of raids in which bombs were dropped, 19.)				233 (6)	5,049 (132)	20	67 (10)	£11,507	..	..	..
From Vol. III, App. III (B).											
Grand Total 1914-18. (No. of raids in which bombs were dropped, 52.)				2,772 (1,078)	164,821 (70,642)	857 (487)	2,058 (1,444)	£1,434,526	..	..	..
				= 73 tons (= 31 tons 11 cwt. 69 lb.)							
				= 10 cwt. 82 lb.)							

* Note. 'M.P.D.' refers to the Metropolitan Police District which covers an area within a radius of approximately 15 miles from Charing Cross.

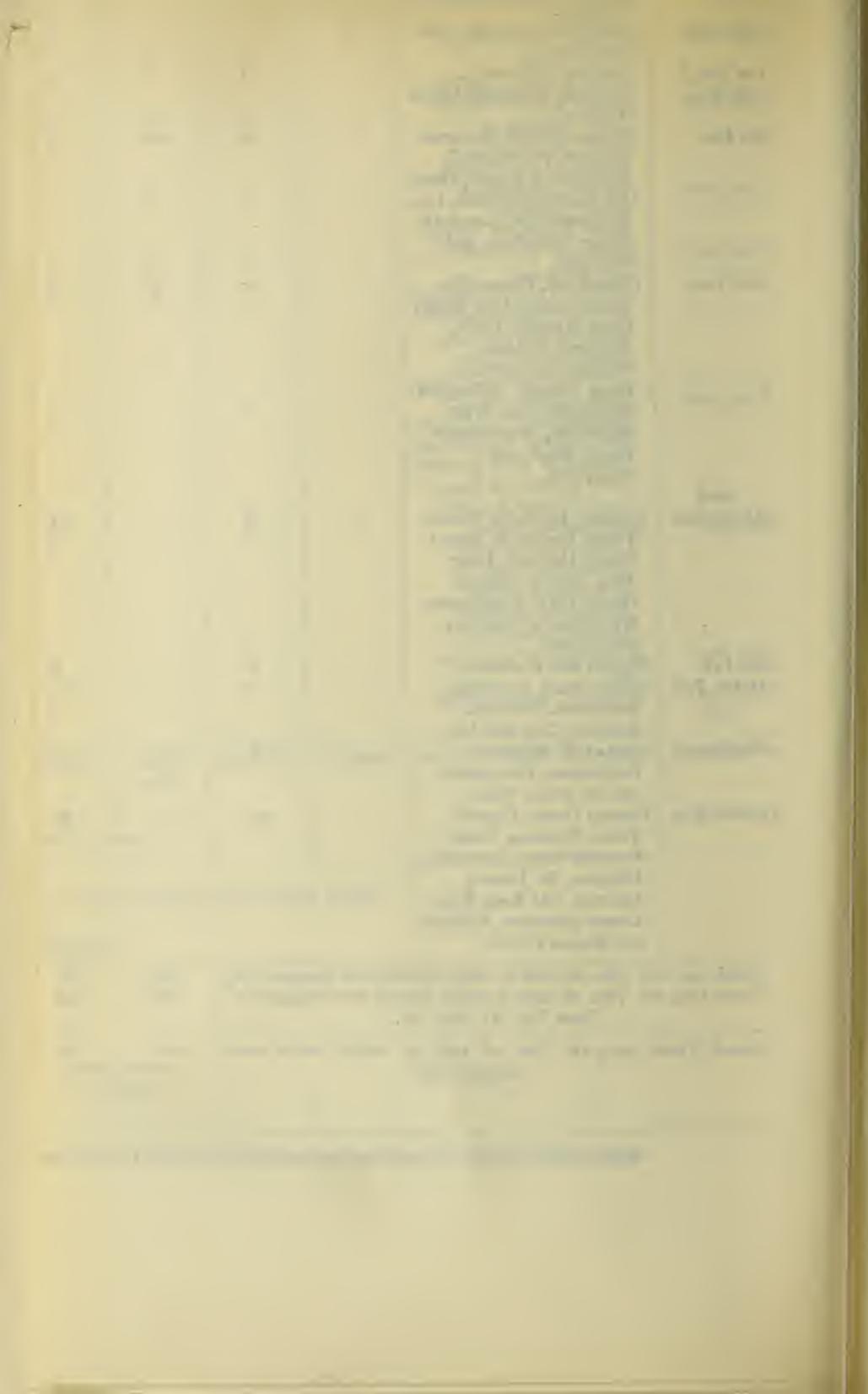


APPENDIX II

AIR RAID STATISTICS FOR THE COUNTY OF LONDON, 1917-18*

Date.	Districts principally affected.	Airships.	Aeroplanes.	Number of bombs dropped.			Casualties.			Casualties dealt with by London Ambulance Service.	Buildings:		Estimated monetary damage.
				Inceudary.	Explosive.	Total weight in lb.	Killed.	Injured.	Fires caused.		Destroyed.	Seriously damaged.	
1917													
6/7th May	Highbury, Stoke Newington.	..	1	..	5	133	1	1	..	1	..	1	£510
13th June	Whitechapel, Limehouse, Bethnal Green, City, Southwark, Peckham, Bermondsey, Poplar, Shoreditch, Stepney, Dalston, and Hoxton.	..	14	..	92	6,457	145	382	5	60	7	55	£125,953
7th July	Bartholomew Close, Little Britain, Golden Lane, Whitecross Street, Shoreditch, Stoke Newington, Dalston, Camberwell, Borough, and Marylebone.	..	21	..	64	6,051	53	182	7	32	22	87	£203,821
4/5th Sept.	Queen Victoria Street, Tichborne Street, Victoria Embankment, Oxford Street, Strand, Regent's Park, Holloway, Hornsey, Kentish Town, Blackheath, and Woolwich.	..	9	..	40	2,483	14	48	..	..	1	16	£31,548
24th Sept.	Shoreditch, Southampton Row, Piccadilly, King's Cross, Islington.	..	3	16	13	1,519	14	49	2	36	..	..	£24,002
25th Sept.	Millwall, Bermondsey, Camberwell, Old Kent Road, Deptford, New Cross, Blackheath.	..	3	19	7	961	6	21	1	22	..	3	£16,101
29th Sept.	Notting Hill, Kingsland, Hornsey Road, Kennington, Lambeth.	..	4	..	24	1,892	13	86	..	25	..	..	£21,873
30th Sept.	Highgate, Bow, Poplar, Woolwich.	..	8	2	12	1,343	3	29	1	21	7	50	£7,600
1st Oct.	Highbury, Pimlico, Shoreditch, Belgravia, Finsbury Park, Kingsland, and Hackney.	..	8	..	28	2,585	11	41	1	24	..	..	£44,094
19th Oct.	Lewisham, Piccadilly, and Camberwell.	1	..	..	3	1,544	33	49	1	42	10	21	£48,205
31st Oct./1st Nov.	Charlton, Greenwich, Millwall, Deptford, Upper Tooting.	..	3	17	21	1,563	6	5	4	18	1	11	£7,443
6th Dec.	Chelsea, Brixton, Battersea, Stepney, Whitechapel, Clerkenwell, Strand, Grays Inn Road, Shoreditch, Lee, Knightsbridge, Lambeth, Upper Sydenham, and Peckham.	..	6	258	9	3,773	3	15	52	6	..	12	£92,477
18th Dec.	Clerkenwell, Pentonville Road, Bermondsey, King's Cross, Kentish Town, Belgravia, Pimlico, Victoria Embankment, Inner Temple, Aldersgate Street, Holborn, West Smithfield, Westminster Bridge Road, and Southwark.	..	7	47	42	4,392	13	79	13	34	9	42	£225,016
1918													
28/29th Jan.	Stepney, Lambeth, Somers Town, Poplar, St. John's Wood, Holborn, Long Acre, Strand, Bethnal Green, City, Kennington, Wandsworth, Hackney, and Kilburn.	..	4	..	44	4,649	65	159	4	93	17	29	£172,677
16th Feb.	Chelsea and Woolwich.	..	1	..	3	2,426	12	6	..	10	..	..	£18,229
17/18th Feb.	Euston Road, Lewisham, Southwark, Peckham, Holborn, City, and Lee.	..	1	..	19	2,011	21	32	2	34	4	12	£38,898
7/8th March	Maida Hill, Battersea, Paddington, Hampstead, and St. John's Wood.	..	3	..	9	2,877	22	29	1	22	11	48	£30,530
19/20th May	Bethnal Green, Kentish Town, Peckham, Great Portland Street, Lewisham, Islington, St. James's, Hackney, Old Kent Road, Lower Sydenham, Kilburn, and Regent's Park.	..	19	..	46	7,718	39	128	3	91	27	72	£130,733
Total 1917-18. (No. of raids in which bombs were dropped, 18.)				359	481	54,377	474	1,341	97	571	119	466	£1,239,710
Total 1914-16. (No. of raids in which bombs were dropped, 7.)				252	149	25,046	120	367	127	38	55	152	£803,489
From Vol. III, App. IV.													
Grand Total, 1914-18. (No. of raids in which bombs were dropped, 25.)				611	630	7,942.3 = 35 tons 9 cwt. 15 lb.	594	1,708	224	609	174	618	£2,043,199

*Note. The County of London (which includes the City of London) covers the area within a radius of approximately 6 miles from Charing Cross.



APPENDIX III

GERMAN AEROPLANE RAID ON LONDON, 13th JUNE 1917

BOMBS, DAMAGE, AND CASUALTIES

LONDON	<i>Highb-explosive bombs (mostly of 50- kg. weight).</i>	<i>Damage and casualties.</i>
'K' DIVISION.		
Barking.		
North Street.	1	Nil.
East Ham.		
Park Avenue.	1	Unexploded.
Allotments,	1	Nil.
Goosley Lane.		
Gravel Pit,	2	Nil.
Goosley Lane.		
Alexandra Road.	2	Houses damaged. <i>K.</i> : 3 w. 1 ch. <i>Inj.</i> : 1 m. 7 w. 3 ch.
Allotments,	1	Unexploded.
Rancliffe Road.		
Royal Albert Docks.	1	Shed, offices, and railway stock damaged; windows of Seamen's Hospital broken. <i>K.</i> : 8 m. <i>Inj.</i> : 9 m.
Custom House,	1	Windows broken; tramcar damaged. <i>Inj.</i> : 1 m. 4 w. 1 ch.
Freemason's Road.		
Beckton.		
Manorway Farm.	1	Unexploded.
Canning Town.		
Thames Ironworks.	2	Nil.
Plaistow.		
Eastern Road.	1	Windows broken in several houses. <i>K.</i> : 2 w. <i>Inj.</i> : 5 w. 1 ch.
Forest Gate.		
Sebert Road.	1	Houses damaged. <i>Inj.</i> : 6 m. (including 1 soldier) 3 w. 1 ch.
Woodgrange Road.	1	Nil.
Bow.		
Wellington Road.	1	Glass broken; garden damaged.
Union Castle Co.'s Wharf, Bow Creek.	1	In river.
Poplar.		
Woodstock Road.	1	Houses damaged. <i>K.</i> : 1 m.
Wade Street.	1	Houses damaged.
Upper North Street (schools).	1	Schools and houses damaged. <i>K.</i> : 18 ch. <i>Inj.</i> : 2 m. 2 w. 30 ch.
Swale Street.	1	Houses damaged.
Morant Street.	1	Houses damaged. <i>K.</i> : 1 m. 1 w. 1 ch. <i>Inj.</i> : 1 m. 5 w.

	<i>High-explosive bombs (mostly of 50- kg. weight).</i>	<i>Damage and casualties.</i>
LONDON (cont.)		
Limehouse.		
Burdett Road.	2	Houses damaged. One bomb unexploded
Commercial Road.	1	Town Hall, houses, and church damaged. <i>K.</i> : 1 m. <i>Inj.</i> : 5 m. 3 w.
Copenhagen Place.	2	Oil and cake mills damaged. <i>K.</i> : 2 m. <i>Inj.</i> : 1 m. 1 w.
Salmon Lane.	1	Houses damaged. <i>Inj.</i> : 5 m. (including 2 constables) 2 w. 1 ch.
Regent's Canal, near Commercial Road.	1	Unexploded.
Stratford.		
Carpenters Road.	1	House damaged. <i>K.</i> : 1 m.
Angel Lane.	1	Nil.
Broadway.	1	Shop damaged by fire. <i>K.</i> : 2 m.
The Grove, St. John's Churchyard.	1	Nil. <i>K.</i> : 1 m. <i>Inj.</i> : 4 m. 2 w.
The Grove.	1	House damaged.
'H' DIVISION.		
Tower Hill.		
The Mint.	1	Mechanic's shop damaged. <i>K.</i> : 4 m. <i>Inj.</i> : 30 m.
Tower.		
The Moat.	1	Unexploded.
Mountford Street.	1	Houses damaged.
Mulberry Street.	1	House damaged.
Whitechapel.		
High Street and Half Moon Passage.	2	House damaged. <i>K.</i> : 1 ch.
Church Lane.	1	Nil. <i>K.</i> : 3 m. 1 ch. <i>Inj.</i> : 2 m. 1 w. 2 ch.
Fire Station, Commercial Road.	1	Building damaged. <i>K.</i> : 1 m. <i>Inj.</i> : 3 m. (including 1 soldier) 1 w. 1 ch.
Adler Street.	1	House damaged. <i>K.</i> : 1 m.
Plumber's Row.	1	Two houses demolished; others damaged. <i>K.</i> : 1 w. <i>Inj.</i> : 1 m. 2 w. 4 ch.
Stepney.		
Grosvenor Street.	1	Houses damaged. <i>K.</i> : 1 w. 1 ch. <i>Inj.</i> : 3 m. (including 1 constable) 5 w.
Spitalfields.		
Flower and Dean Street.	1	House damaged. <i>K.</i> : 1 ch. <i>Inj.</i> : 3 m. 1 w.
Bethnal Green.		
Fashion Street.	1	Factory damaged.
Ducal Street.	1	House damaged; room wrecked.
Gibraltar Walk.	1	House destroyed. <i>K.</i> : 2 w. 6 ch. <i>Inj.</i> : 5 w. 11 ch.
Camlet Street.	1	In roadway.

	<i>High-explosive bombs (mostly of 50- kg. weight).</i>	<i>Damage and casualties.</i>
LONDON (cont.)		
Thorold Street.	1	Fell through a house.
Rochelle Street.	1	Houses damaged. <i>Inj.</i> : 7 m. 5 w. 10 ch.
'G' DIVISION.		
Hoxton.		
Appold Street.	2	Damage to buildings.
Curtain Road.	1	Houses damaged. <i>K.</i> : 2 m. <i>Inj.</i> : 6 m. 1 w.
Great Eastern Street.	3	Houses damaged. <i>K.</i> : 1 w. <i>Inj.</i> : 2 m. 3 w. 2 ch.
Chiswell Street.	1	Brewery damaged. <i>Inj.</i> : 1 m.
Golden Lane.	1	House damaged.
Bunhill Row.	1	House damaged. <i>Inj.</i> : 1 m.
Vestry Street.	3	Mission Hall and houses damaged. <i>Inj.</i> : 8 m. 1 w. 6 ch.
Moneyer Street.	1	House damaged.
East Road.	5	Houses damaged.
Provost Street	1	House damaged.
Central Street.	5	Houses damaged. <i>K.</i> : 6. m. (including 1 constable) 4 w. 2 ch. <i>Inj.</i> : 8 m. 3 ch.
Peartree Street.	2	Houses damaged.
Eastwick Street.	1	Foundry damaged.
Shoreditch.		
Charlotte Street.	1	Factory burnt out. <i>Inj.</i> : 2 m.
Tabernacle Square.	1	Fire station and houses damaged. <i>K.</i> : 1 m. 1 ch. <i>Inj.</i> : 4 m. 1 w.
Tabernacle Street.	1	House damaged. <i>K.</i> : 1 ch.
Cowper Street.	1	School damaged. One bomb unex- ploded.
Little Leonard Street.	1	Shop and houses damaged. <i>K.</i> : 3 m. <i>Inj.</i> : 4 m. 1 w. 1 ch.
French Place.	1	Printing works damaged.
Old Street.	1	Nil. <i>Inj.</i> : 2 m. 1 ch.
Dodsley's Folly.	1	Houses damaged. <i>Inj.</i> : 3 w.
Great Chart Street.	1	Technical Institute and houses dam- aged. <i>K.</i> : 1 w. <i>Inj.</i> : 2 w. 1 ch.
Styman Street.	1	} Nil. <i>Inj.</i> : 1 m.
Willow Street.	—	
City.		
Liverpool Street Station.	3	Two trains wrecked, station damaged. One bomb unexploded. <i>K.</i> : 16 m. (including 4 soldiers). <i>Inj.</i> : 15 m. (including 4 soldiers).
Billiter Square.	2	Unexploded. Buildings damaged. <i>K.</i> : 2 m. <i>Inj.</i> : 1 m.
Bishopsgate.	1	Top story of offices wrecked. <i>Inj.</i> : 2 m. 1 w.

	<i>High-explosive bombs (mostly of 50-kg. weight).</i>	<i>Damage and casualties.</i>
LONDON (cont.)		
Fenchurch Street.	2	Three floors of building demolished. <i>K.</i> : 15 m. 5 w. <i>Inj.</i> : 12 m. 1 w. 1 ch.
Aldgate, High Street.	1	Burst on pavement; windows broken. <i>K.</i> : 9 m. 2 w. 2 ch. <i>Inj.</i> : 12 m. 6 w. 4 ch.
Aldgate, District Railway.	1	Nil.
Creechurch Lane.	1	Top story of building demolished. <i>Inj.</i> : 1 m.
St. Mary Axe.	1	Slight damage to building. <i>K.</i> : 1 m.
Maiden Lane.	1	Fur merchant's premises wrecked. <i>Inj.</i> : 3 m. 1 w. 2 ch.
Paternoster Square.	1	Warehouses damaged. <i>K.</i> : 1 ch. <i>Inj.</i> : 14 m. 5 w. 3 ch.
Charles Street, Bridgewater Square.	1	Unexploded.
Allhallows Churchyard, London Wall.	1	Unexploded. Nil.
Beech Court.	1	Foundry yard damaged. <i>K.</i> : 8 m. <i>Inj.</i> : 10 m.
'J' DIVISION.		
Dalston.		
Woodville Road.	1	House damaged. <i>K.</i> : 1 w. 4 ch. <i>Inj.</i> : 2 m. 1 w. 2 ch.
Mathias Road.	1	Houses damaged. <i>Inj.</i> : 4 m. (including 1 soldier) 2 w. 1 ch.
Mayville Street.	1	} Nil. } House damaged. <i>Inj.</i> : 1 ch.
St. Peter's Street.	—	
'E' DIVISION.		
Saffron Hill.	1	Printing works and houses damaged by fire. <i>Inj.</i> : 2 m. 1 w.
'M' DIVISION.		
Southwark.		
Sumner Street.	1	Demolished ground floor store and storeroom. <i>K.</i> : 1 w. 2 ch. <i>Inj.</i> : 6 m. 13 w. 5 ch.
Duke Street.	1	Unexploded. House damaged.
Bermondsey.		
Staple Street.	1	Factory damaged. <i>K.</i> : 3 m. <i>Inj.</i> : 1 m.
Tanners Street.	1	Nil.
Horney Lane.	1	Tan yard damaged. <i>Inj.</i> : 4 m.
Larnaca Street.	1	Nil. <i>Inj.</i> : 1 w.
Powell's Yard,	1	Unexploded. Nil.
Tooley Street.		
<i>Total:</i>	118	<i>K.</i> : 92 m. 25 w. 43 ch. <i>Inj.</i> : 212 m. 98 w. 98 ch.

	<i>Highb-explosive bombs (mostly of 50-kg. weight).</i>	<i>Damage and casualties.</i>
KENT		
Margate.	5	Nil. <i>Inj.</i> : 1 m. 1 w. 2 ch. 2 bombs unexploded.
ESSEX		
Barling.	1	Nil.
Shoeburyness.	4	Nil. <i>Inj.</i> : 1 m. 1 ch.
<i>Total:</i>	128	<i>K.</i> : 92 m. 25 w. 43 ch. <i>Inj.</i> : 214 m. 99 w. 101 ch.

BY ANTI-AIRCRAFT FIRE (TOTALS)

	<i>Shells.</i>	<i>Damage and casualties.</i>
Various districts.	Number not known.	Houses damaged. <i>K.</i> : 2 m. <i>Inj.</i> : 6 m. 11 w. 1 ch.
<i>Total casualties:</i>	{	<i>H.E. Bombs.</i> <i>K.</i> : 92 m. 25 w. 43 ch. = 160
		<i>Inj.</i> : 214 m. 99 w. 101 ch. = 414
	{	<i>A.A. Fire.</i> <i>K.</i> : 2 m. = 2
<i>Inj.</i> : 6 m. 11 w. 1 ch. = 18		
	<i>Grand Total:</i>	<i>K.</i> : 94 m. 25 w. 43 ch. = 162 <i>Inj.</i> : 220 m. 110 w. 102 ch. = 432

Note. To above casualties must be added:

Killed—Captain C. H. C. Keevil, Royal Flying Corps.

APPENDIX IV

METHODS SUGGESTED FOR THE PREVENTING OF AIR
RAIDS IN THE UNITED KINGDOM

[*Memorandum of Major-General H. M. Trenchard, prepared for the Commander-in-Chief, June 1917*]

Before attempting to lay down methods, the following points must be understood:

(a) To keep one machine in the air all day requires five machines and five pilots at least.

(b) It is no good suggesting methods which the present limitation of aircraft would prevent being carried out regularly and systematically, such as choosing an objective outside the normal range of the machine.

(c) The least effective and most expensive way of protecting a place like LONDON is to have constant patrols.

(d) The limitation of the output of pilots, machines, and engines owing first to the shortage of labour and secondly to the shortage of raw material.

The following methods are suggested:

1. To capture the Belgian Coast up to HOLLAND.
2. Landing people with explosives to set fire to sheds at night.
3. Reprisals.
4. Patrols.

I. CAPTURE OF THE COAST.

With regard to this, the advantages are:

(a) If the coast was captured the German machines would then have to cross our lines or pass over neutral country. If they crossed our lines they would be engaged by our anti-aircraft guns; they would have to pass over our aerodromes, and our fast machines would be able to see them and go up and engage them over the latter long before they got to ENGLAND. The Germans would also have to come back the same way, again being engaged both by aeroplanes and anti-aircraft guns.

(b) They would also be more easily seen and warnings could be sent to ENGLAND.

(c) Their landing-grounds would be further away from ENGLAND.

2. LANDING PEOPLE AT NIGHT.

The advantages of this system are:

(a) Very few machines are required to do this. Two or three machines could land in the vicinity of a big aerodrome on a really good moonlight night and set fire to the sheds.

(b) If these big bombing machines which the Germans are using could be burnt, it would take some considerable time to provide new ones.

The disadvantages are:

(a) It could not be done except on a good night.

(b) It is impossible to say on which aerodrome the machines might be. Even if a squadron is located at one aerodrome, there is nothing to prevent it from moving to another unknown to us.

(c) If the sheds were set alight and destroyed it would only be possible to do this once or twice before the sheds were heavily protected and if unsuccessful the first time it would probably fail again at subsequent attempts.

(d) The man landed would have to trust to get through to HOLLAND to get away and probably this would be impossible, but no doubt we could get volunteers for it.

3. REPRISALS (by a few machines or by large organized squadrons).

The advantages of this method are:

(a) The German population is more easily moved by having their own country touched than the English population.

(b) The first method is to use a few machines which could be made available in England and sent out to us here to go long distances such as to AIX-LA-CHAPELLE, COLOGNE, COBLENZ and to send one or two of these machines with selected pilots to drop bombs and papers warning them that more machines would be sent as was done in the case of the French bombing raid on FREIBURG. This might have some effect without entailing the use of large forces as single machines would have a greater chance of getting through and back again without being seen, and this could be done at once.

(c) The G.O.C. the German Flying Corps has stated that the distant towns are out of reach of British machines, and he has assured the whole country of this.

(d) This might have a great effect on the enemy as it might make him withdraw a certain number of machines, and certainly withdraw pilots for the local defence of towns.

The disadvantages are:

(a) There are no army machines in France with sufficient range to be able to carry out raids on Prussian towns, but this difficulty would be got over by improvised machines. There are a certain number of machines in this country that would be able to carry out raids on the Southern German towns such as FREIBURG, but there are machines which could be provided from home, if the information I have been supplied with is correct (such as the De Hav. 4 with B.H.P. engine and $5\frac{1}{2}$ hours petrol), but these machines could not bomb the far distant towns except on favourable occasions.

(b) To organize bombing squadrons with a large range on a large scale would take a considerable time.

(c) Another disadvantage of reprisals is they would only lead to further reprisals from the enemy. We must be prepared, if reprisal methods are to be adopted, to carry it through and outlast the enemy. They would always defeat us at reprisals unless we put forth our whole energy and this would seriously interfere with the supply of the machines necessary for artillery work.

4. PATROLS.

I will discuss these rather generally from the point of view of three possible systems:

(a) Constant patrols protecting LONDON, the English Coast, or the Coast out here. The patrolling of these areas would mean a large number of machines, and even then, as the air is so vast, it would still be comparatively easy for the German machines to get to LONDON without having been seen or caught by any of our patrols on the way. This method might, of course, with luck, intercept the machines and either bring them down or drive them back. This has been proved without a doubt during the last two years of fighting on the Western front. The system would, however, lock up a very large number of machines and pilots on a purely defensive plan which would never stop an aggressive enemy.

(b) Another system of patrols would be to patrol over the enemy's

aerodromes to watch for machines leaving. This would also entail a large number of machines and in addition they would either have to patrol under the fire of the enemy's anti-aircraft guns, or if they kept at such a height that the guns could not do much harm then the aerodrome would very often be out of sight. It would be very hard to know whether our machines were patrolling over the right aerodromes, as during the summer the enemy has many temporary aerodromes, and all our information goes to prove that they move their machines constantly from one aerodrome to another. Temporary aerodromes are made fairly easily during the dry weather.

(c) A third system of patrolling would be to have one or two machines with long-range wireless to patrol the Coast from DUNKIRK to HOLLAND watching for the German machines to come out to sea. This, of course, has the same drawback as the first system of patrolling, i.e. the machine would probably not see the enemy, but, of course, if he did see them and sent his wireless message ENGLAND would be warned earlier and also DUNKIRK, at both of which places a special group of fast machines could be located ready to go up and attempt to follow and attack the raiders. This might be successful at times, but it is not a sure method.

Other methods which have been suggested are:

The constant bombing of German aerodromes. But I would point out that during the whole time we have been on the Western Front only once has a bomb hit one of our hangars, on this occasion it destroyed five machines. We have bombed the enemy's aerodromes a great number of times, but I do not suppose we have destroyed more than one hundred of his machines in this way, as even if we do hit a shed it is probably a small one containing one machine only, as many German aerodromes have this type of shed.

Daylight bombing from a height is still very inaccurate and though large towns and big stations are easy to hit, it is very hard to hit a small individual shed.

The chief point to remember is that practically none of our machines have got the necessary range or tank capacity for long-distance bombing. It should be remembered that over a year ago we asked that, as soon as the Army had been supplied with the necessary number of machines to enable the Army's operations to be carried out efficiently, ten bombing squadrons should be provided with a view to carrying out this sort of work. I regret to say we are apparently nowhere near receiving these latter squadrons as we have not yet got the necessary number of machines to meet the needs of the Army.

15th June 1917.

APPENDIX V

GERMAN AEROPLANE RAID ON LONDON, 7th JULY 1917

BOMBS, DAMAGE, AND CASUALTIES

LONDON (City)	<i>High-explosive bombs (mostly of 50- kg. weight).</i>	<i>Damage and casualties.</i>
Aldersgate Street.	1	Damage to offices.
Shaftesbury Place.	1	Nil.
Cherry Tree Court, Aldersgate Street.	1	Warehouse damaged.
Barbican, in roadway opposite Australian Avenue.	1	Unexploded.
Aldermanbury.	1	Unexploded. Damage to top story of warehouse.
Coleman Street.	1	Damage to shops and offices. <i>Inj.</i> : 1 m.
Lothbury.	1	Two floors of bank damaged. <i>Inj.</i> : 4 m.
Bartholomew Close.	2	Warehouses burnt out, and neighbour- ing premises damaged. <i>K.</i> : 5 m. <i>Inj.</i> : 3 m. 1 w.
Cox's Court, Little Britain.	1	Warehouses damaged. <i>K.</i> : 1 m. <i>Inj.</i> : 4 w.
Little Britain.	1	Severe damage to warehouse.
Central Telegraph Office.	1	Roof and floor below demolished. <i>K.</i> : 1 m. (soldier). <i>Inj.</i> : 4 m. (including 1 soldier).
Whittington Avenue, Leadenhall Street.	1	Unexploded. Archway slightly dam- aged.
Leadenhall Street.	3	Shops and warehouses damaged. One bomb unexploded.
Creechurch Lane.	1	Houses damaged.
Fenchurch Street.	3	Ironmongers' Hall, shops and offices damaged. One bomb unexploded. <i>K.</i> : 1 m.
Lime Street.	1	Roof and upper floors seriously damaged. <i>Inj.</i> : 1 m.
Near Moorgate Street Station, Metropoli- tan Railway.	1	Unexploded.
Red Lion Wharf, Upper Thames Street.	2	Slight damage.
Synagogue, Duke Street, Houndsditch.	1	Slight damage.
2/3 Lower Thames Street.	1	Buildings seriously damaged. <i>K.</i> : 4 m. <i>Inj.</i> : 6 m. 1 ch.

	<i>High-explosive bombs (mostly of 50- kg. weight).</i>	<i>Damage and casualties.</i>
LONDON (City) (cont.)		
Church of St. Edmund, Lombard Street.	1	Unexploded. Damage to roof and adjoining premises. <i>Inj.</i> : 1 w.
Baltic Exchange, 24 St. Mary Axe.	1	Slight damage to roof and ground floor.
METROPOLITAN AREA		
‘G’ DIVISION.		
Shoreditch.		
Gifford Street.	1	Houses damaged. <i>K.</i> : 1 m. 1 ch. <i>Inj.</i> : 1 m. 2 w. 2 ch.
Styman Street.	1	Houses damaged. <i>K.</i> : 1 w.
Vincent Street.	1	Unexploded. Slight damage.
Murray Street.	1	Houses damaged. <i>K.</i> 2 m. <i>Inj.</i> : 2 m. (soldiers) 4 w. 2 ch.
Herbert Street.	1	Houses damaged. <i>K.</i> : 1 w. <i>Inj.</i> : 3 m. 1 w. 1 ch.
Britannia Street.	1	Houses damaged. <i>Inj.</i> : 2 ch
Cavendish Street.	1	Houses damaged. <i>K.</i> : 1 m. 1 ch. <i>Inj.</i> : 3 m. 6 w. 6 ch.
Wenlock Road.	3	Timber yard, zinc mills, and houses damaged. <i>K.</i> : 3 m. <i>Inj.</i> : 6 m.
Whitecross Street.	1	Houses damaged. <i>K.</i> : 1 m. <i>Inj.</i> : 2 m. 2 ch.
Junction of Haberdasher Street and East Road.	1	Houses damaged.
Golden Lane.	1	Houses damaged. <i>K.</i> : 2 m. <i>Inj.</i> : 14 m. 4 w. 1 ch.
Goswell Road.	1	Houses damaged. <i>Inj.</i> : 1 w.
Old Street.	1	House damaged.
Junction of Goswell Road and Powell Street.	1	Unexploded.
Chiswell Street.	1	Houses damaged. <i>Inj.</i> : 4 m.
Artillery Ground (H.A.C.), Finsbury.	1	Unexploded.
‘H’ DIVISION.		
Bishopsgate Goods Station.	3	Damage to archways, buildings, and houses. <i>Inj.</i> : 2 m.
Code Street, Bethnal Green.	1	Houses damaged. <i>Inj.</i> : 2 m. 2 w. 6 ch.

	<i>High-explosive bombs (mostly of 50- kg. weight).</i>	<i>Damage and casualties.</i>
METROPOLITAN AREA (cont.)		
Buxton Street, Spitalfields. Tower Hill.	1	Nil.
Nightingale Lane, Wapping.	1	Houses damaged; 3 horses killed. <i>K.</i> : 7 m. 1 ch. <i>Inj.</i> : 14 m. 1 w. Houses damaged; 1 horse killed. <i>Inj.</i> : 1 m.
'J' DIVISION.		
Dalston. Boleyn Road.	1	Houses damaged. <i>K.</i> : 5 m. 2 w. 2 ch. <i>Inj.</i> : 3 w. 6 ch.
Kingsbury Road (West London Jewish Cemetery).	1	Nil.
North London Railway (near Mildmay Park Station).	1	Unexploded.
'M' DIVISION.		
Newcomen Road, Southwark.	1	Houses damaged.
Battle Bridge Lane, Bermondsey.	1	Unexploded. House damaged.
'N' DIVISION.		
Field near Tottenham Gas Works.	4	Nil.
Field near Old Church Road, Chingford.	1	Surface drain of Metropolitan Water Board damaged.
Vegetable Oil Extraction Co., Angel Road, Edmonton.	2	Buildings damaged; one horse killed.
Cowper Road, Stoke Newington.	1	Houses damaged.
St. Matthias Vicarage, Wordsworth Road, Stoke Newington.	1	Damage to glass and brickwork. Houses damaged.
Ponders End Sewage Farm.	1	Nil.

	<i>High-explosive bombs (mostly of 50-kg. weight).</i>	<i>Damage and casualties.</i>
METROPOLITAN AREA (<i>cont.</i>)		
'Y' DIVISION.		
Wellers Court, near Pancras Road.	1	Houses damaged. <i>K.</i> : 1 m. <i>Inj.</i> : 2 m. 1 ch.
Midland Railway Goods Depot, Ossulston Street, Somers Town.	1	Unexploded. Broken glass and damage to roadway.
In waste ground between Wharf Road and Battle Bridge Road.	1	Nil.
'T.A.' DIVISION.		
Barge <i>Glencairn</i> moored in Thames off Cotton's Wharf.	1	Barge sunk. Premises on shore damaged by concussion.
In river off Billingsgate Fish Market.	1	Pier damaged. Premises on shore damaged by concussion.
MARGATE	3	Houses damaged. <i>K.</i> : 1 m. 2 w. <i>Inj.</i> : 2 w. 1 ch.
<i>Total:</i>	76	<i>K.</i> : 36 m. 6 w. 5 ch. <i>Inj.</i> : 75 m. 32 w. 31 ch.

BY ANTI-AIRCRAFT FIRE (TOTALS)

	<i>Shells</i>	<i>Damage and casualties</i>
Various districts.	52	Houses damaged. <i>K.</i> : 4 m. 3 w. 3 ch. <i>Inj.</i> : 23 m. 13 w. 19 ch.
<i>Total casualties:</i>	{ H.E. Bombs.	<i>K.</i> 36 m. 6 w. 5 ch. = 47 <i>Inj.</i> : 75 m. 32 w. 31 ch. = 138
	{ A.A. fire.	<i>K.</i> : 4 m. 3 w. 3 ch. = 10 <i>Inj.</i> : 23 m. 13 w. 19 ch. = 55
	<i>Grand Total:</i>	<i>K.</i> : 40 m. 9 w. 8 ch. = 57 <i>Inj.</i> : 98 m. 45 w. 50 ch. = 193

Note. To above casualties must be added:

Killed: Second Lieutenant W. G. Salmon and Lieutenant J. E. R. Young, Royal Flying Corps.

Wounded: Captain J. Palethorpe and No. 21547 2nd Air-Mechanic C. C. Taylor, Royal Flying Corps.

APPENDIX VI

HOME DEFENCE

[*Report of Lieutenant-General J. C. Smuts's Committee, July 1917*]

1. The War Cabinet at their 181st meeting held on the 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 other such experts as they may desire should examine:

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

ii. The air organization generally and the direction of aerial operations.'

2. We regard the first subject for our examination as the more pressing and we deal with it accordingly in this first report, so far as the defence of the metropolitan area is concerned.

The second subject of our inquiry is the more important and will consequently require more extensive and deliberate examination. We propose to deal with it in a subsequent report.

3. London occupies a peculiar position in the Empire of which it is the nerve centre, and we consider, in the circumstances, that its defence demands exceptional measures. It is probable that the air raids on London will increase to such an extent in the next twelve months that London might through aerial warfare become part of the battle front. We think, therefore, that it is necessary to take special precautions, so far as the defence of London is concerned, and so far as this may be done without undue prejudice to operations in the Field and on the High Seas, as the fighting forces must, as a matter of general principle have the first call upon our output of aircraft and anti-aircraft guns.

4. The arrangements for Home Defence, including that of the London area, against hostile air raids, have been undergoing a continual and rapid transformation, which, together with other causes, has militated against efficiency. In the first instance, attacks were made by Zeppelins at night and our defences were so organized as to deal with this form of attack. Anti-aircraft guns, singly or in pairs, or in large numbers, were placed at convenient points, and aeroplanes of no great power or speed were disposed at suitable centres.

After some modification, the original dispositions were found to be adequate to meet night attacks by Zeppelins. We have, however, now to meet attacks of an entirely different character, which take the form of invasions by squadrons of aeroplanes in formation and our arrangements for defence are accordingly being adapted to meet this development.

One cannot, however, entirely preclude the possibility of a repetition of Zeppelin attacks, and it would consequently be unwise to abandon the earlier defence arrangements. Additions to these arrangements are, however, necessitated by the new 'formation attack' by day. The defence against Zeppelins was effectually carried out, not only by individual anti-aircraft guns, but also by single aeroplanes fitted with special armament.

As operations were conducted by night, there was no question of formation either for attack or defence. Now, however, that the attack is made by day by large enemy units in formation, one or two anti-aircraft guns firing from any particular point cannot hope to cause serious damage, and generally have no other effect than that of frightening the enemy pilots, while the defending aircraft, unless they can also operate in formation, are liable to very serious risk and cannot do much more than hover round the outskirts of the enemy formation. An attack in formation could, we think, only be properly met by a barrage fire from guns concentrated in batteries at suitable points in front of the area to be defended, or by flights or squadrons whose object is, by concentrated attack, to break up the hostile formation and destroy individual machines after they have been scattered out of their formation.

5. The relevance of these remarks is well illustrated by what happened in the air raid over London on Saturday, 7th July. The enemy machines attacked in definite formation which they maintained throughout the raid. In our view they should have been met and repelled by a heavy barrage of gun-fire before they reached London. Instead of this they were only subjected to a sporadic gun-fire in the London area which did them no observable damage. As regards aeroplanes on that occasion, we actually disposed of a larger number of first-class machines than the enemy, but our machines were distributed among a number of stations and some of them came in in dribbles from various training centres.

Our machines were not in formation when in the air, and even when they attempted to concentrate they did not come under a unified command in the air, nor have they been trained so to fight. The result was that their very spasmodic or guerrilla attacks failed to make an impression on the solid formation of the enemy, and the damage that was done by our superior numbers of first-class R.F.C. machines was comparatively negligible.

We have investigated the circumstances in some detail and are informed that the reasons why greater results were not achieved were that some of our pilots were not accustomed to the new machines they were flying, that certain machines were not used because of missing spare parts, and a certain amount of shells that were fired were useless on account of defective fuses. These defects should, and can be remedied with all possible speed, but it is to the general arrangements and organization that we wish to refer more fully.

6. Four separate agencies contribute to the defence of the London area against air raid:

(a) *Royal Naval Air Service*, which is not under the Home Command, but works under the direction of the senior naval officers in the naval districts, but in co-operation as far as possible, with the Home Defences.

There seems to be a general agreement among those whom we have consulted that for the limited purpose of the defence of London, the present division of command in this respect should not be disturbed.

The principal function of the Royal Naval Air Service Squadrons is to deal with enemy raiders on their return journey, as they recross the Channel. They did so very effectively on the occasion of the last raid, and

after consideration of all the circumstances, we are disposed to think that the above squadrons should continue to operate under separate Naval Commands, but in close co-operation with the Home Defence.

(b) *The Observation Corps* (distinct from the Royal Flying Corps or Royal Naval Air Service), which consists of a number of observers round London, mostly infantry soldiers, often elderly and not specially qualified for the duties they have to perform.

This Corps is directly under orders of the Field-Marshal Commanding Home Defences.

(c) *Various incomplete units or single machines* of the Royal Flying Corps allocated to Home Defence, under the Command of Colonel Higgins.

(d) The anti-aircraft guns of the London area under the command of Colonel Simon.

7. The last three agencies operate separately under orders of the Home Defence head-quarters which is the only connecting link between them. This system appears to us to involve too great a dispersal of Command when dealing with a problem like the air defence of the London area, which is not only of very far-reaching military and political importance, but also constitutes a well marked, distinct task, separable from other problems of Home Defence, which accordingly calls for a corresponding concentration of executive command.

Our first recommendation therefore is that:

Subject to the control of the Field-Marshal Commanding-in-Chief of the Home Forces, a senior officer of first-rate ability and practical air experience should be placed in executive Command of the air defence of the London area including the above services (b) (c) (d) of paragraph 6 above, and that this officer should be assisted by a small but competent staff, who should be specially charged with the duty of working out all plans for London Air Defences.

This officer would take his instructions from the Field-Marshal and would in turn issue his orders to the Observation Corps, the Officer Commanding the anti-aircraft guns, and the various Air Units. The unity of command which is essential to any warlike operation, whether of an offensive or defensive character, would be thus achieved. *We think that this officer should be appointed without delay* so that he may at once set to work to deal with the various pressing problems connected with London air defence, some of which are referred to below.

In view of the possibility of the recurrence of Zeppelin attack, as well as for other reasons, we think it would be inadvisable to remove the anti-aircraft guns from their present stations in the London area. In our view, the best defensive use of anti-aircraft guns against hostile aeroplanes attacking by day, would be for them to put up a barrage in front of and covering London, and our second recommendation accordingly is that:

Immediate attention should be given to the question of the numbers and disposition of anti-aircraft guns to put up such a defensive barrage.

It is true that there is at present said to be an insufficiency of guns for

this purpose but, as stated in paragraph 3 above, we regard the defence of London as so important as to call for exceptional measures, and special endeavours should therefore be made to provide an adequate number of guns for this purpose.

8. A more pressing problem, in our opinion, is the provision and organization of a sufficient number of air units, trained to fight *in formation*, and their proper disposition to dispel any air attack on London. At present the only reliable unit formed for this purpose is the squadron specially detailed a week ago from the Western front. Three other units are in process of formation, but they neither have the necessary number of machines nor have the pilots the required training for fighting in formation. We understand that an additional squadron, complete in point of numbers, will be furnished almost immediately and posted to the North-East of London. Another squadron to be disposed to the South-East should be complete in numbers in three or four weeks. Both of these will, however, require to be properly trained to manœuvre in formation in suitable units. Our third recommendation therefore is that:

The completion and training of these three additional squadrons, successively, be pushed on as rapidly as possible and that, in the meantime, the return of the first unit to France should not be sanctioned until the air defence of London is reasonably secure.

9. In the course of our investigation, we considered the point whether our present type of fighting machine is the best to cope with the slower but more powerful Gotha raiders. In regard to this we make no recommendations and leave the problem for the further consideration and study of the experts of the Air Board, the Admiralty, the War Office, and the Ministry of Munitions.

10. The question of the provision of sufficient aircraft for defence purposes and for the formation of a reserve is one which, in our view, requires careful and immediate consideration. The enemy may possibly adopt the ruse of sending a small number of machines well in advance of his main attack in order to lure our squadrons into the air; the main enemy force may then appear on the scene and find himself unchecked, owing to the fact that our machines in coping with the advanced patrols had exhausted their petrol, and our pilots, their energy. We are advised that, theoretically, for our machines in the air to descend, refill with petrol, and reascend to the proper height, would take some 45 minutes, but in practice other factors would supervene and the actual time taken would be considerably longer. The result might well be that the main enemy force would meet with practically no opposition, and after doing the maximum amount of damage, might return to its base with immunity and intact. In view of such a situation, which might well arise at any time, we submit that it might be advisable to avoid sending up more units than are necessary on the first warning of a coming raid. Such a contingency we think must be contemplated and to meet it reserves should be kept in hand. We accordingly recommend that:

The air defence units for the London area should be sufficient not only to cope

with feints, but to meet the real attack or a possible second attack following close on a first attack.

The formation and retention of such a reserve is only in accordance with the general and elementary principles of warfare.

11. We believe that if prompt effect is given to the above recommendations, subject always to the adequate and reasonable provision of aircraft for naval and military operations by land and sea, a fair measure of security for the London area from hostile raids may be obtained until, at any rate, some unforeseen development takes place.

APPENDIX VII

NIGHT AIR RAIDS ON LONDON

[Memorandum of Lieutenant-General J. C. Smuts, September 1917]

The recent night air raids on the London area have formed the subject of repeated discussion between the Air Board, the Home Defence Staff and myself, and it will be useful to summarize the principal considerations and conclusions provisionally come to.

It is interesting to note how the enemy is changing the form of his attack as our defence develops. In view of our defences and his consequent losses he is no longer repeating the Zeppelin night attacks. Again, since the sensational aeroplane day raid on London last July our defences against that form of attack have been rapidly pushed forward, and in their recent attempts the raiders have not been able to penetrate the line of our coast defences by day.

The enemy has now at last resorted to the form of attack which our air commanders have long anticipated, and which it is most difficult to meet—viz. night attacks by aeroplanes. This form of attack we have for a long time now been carrying out with comparative impunity against his aerodromes, depots, bases, and lines of communication in France and Belgium. Almost every night tons of explosives are dropped by our aeroplanes on these objectives, and the enemy has as yet developed no means of meeting this attack. Again, the enemy not infrequently crosses our lines at the front by night for the purpose of bombing objectives in our rear, and it is admitted that so far no form of defence against these raids has proved adequate.

Although the recent night attacks on London were made in bright moonlight, there is no reason why such attacks should not be attempted even on dark nights, so long as other weather conditions are favourable. The line of the Thames would furnish sufficient guidance to the raiders even on a dark night, and the working of our searchlights would indicate to them even at a great distance the total London area for which they are making; but of course it would not be possible for them to distinguish any particular locality or objective under such conditions, and the bombing would have to be general instead of being directed to specific objectives.

Cloudy, rainy or uncertain weather would form very unfavourable conditions for night raids, and no development of this form of attack on London on any very large scale need be anticipated until next spring and summer, although repetitions of these attacks should be anticipated as long as the autumn weather remains favourable, and there is consequently time to develop our methods of countering these attacks.

So long as we are adopting merely defensive measures, however, it will be most difficult to prevent these raids, and they may even assume larger proportions and inflict more damage and destruction than hitherto. Our aeroplanes afford no means of defence at night as they find it impossible to see the enemy machines even at a distance of a couple of hundred yards. In the recent night raids they have been sent into the air but to no purpose, and they might just as well have remained on the ground. They are at night useful only against very large and conspicuous objectives, like Zeppelins, once these have been picked up by them. On moonlight nights our anti-aircraft guns are not much use either, as the moonlight neutralizes the searchlights and makes it very difficult for them to pick up the enemy aeroplanes. In raids on dark nights both searchlights and anti-aircraft guns could be used more effectively.

Hitherto only two measures of defence have been suggested against these night raids, both of which will be tried in the London area. The first is the use of more powerful searchlights, whose blinding effect on the pilots will, it is hoped, be such that it will be impossible for them to navigate their machines. A certain number of these powerful searchlights are now being secured both from France and from the Navy. It must, however, be seen how far it will be possible for the enemy pilots to neutralize their effect by wearing smoked glasses.

The second means of defence which has been suggested and with which experiments are now being made is the establishment of a wire screen suspended from balloons and intended to form a sort of barrage in which the enemy machine navigated at night will be caught. It is said that a similar device at Venice has been useful against Austrian night raids. At Venice light balloons are used from each of which (at a height of about 10,000 feet) a wire hangs suspended, a sufficient number of such balloons and wires forming the screen or barrage. With larger balloons connected together it may be possible to have not only perpendicular but also cross wires, and with this idea General Ashmore is now experimenting. To carry this plan into effect, it will be necessary to release a certain number of our large captive balloons from the front and inquiries to this end are now being conducted. It will take some time before it will be known to what extent either or both of the above measures will furnish any reliable defence against night air raids.

The question of shelters and protection for life has also been discussed. It is generally agreed that the time has not yet come to construct dug-outs or special shelters, and it is hoped that they will never become necessary. London has sufficient basements and underground cellars to accommodate the population against all immediate dangers. All that is necessary at the present stage is that by means of the Press the public be kept fully and

continuously advised and warned by the Home Office to retire to houses and basements on the first signal of danger. Every raid should be followed by an official notification of its lessons.

It is possible that a development of these attacks on a larger scale and consequent loss of life may hereafter justify the adoption of further measures and even of a certain amount of compulsion, either under Martial Law or the Defence of the Realm Acts. But so far it cannot be said that the public have unduly ignored the notices and warnings issued to them, and it would be premature at this stage to adopt drastic measures.

Careful attention should be given to the probability of the enemy resorting in future raids to the use of gas shells on a larger scale than hitherto, and to the proper measures that should be taken and suitable notices that should be issued to provide against such a contingency. It may be necessary in the above notices to provide for the closing of windows and doors until not only the raid is passed but also the danger of gassing is passed. At any rate it is a real danger against which it would be wise to take precautions in time. As gas shells are largely used by the enemy at the front, we have full information as to the measure of gassing that might be expected from an air raid in the neighbourhood of crowded houses or areas.

It is felt that the above-mentioned methods of defence touch only the fringe of the danger of these night attacks, and that in such cases the only proper defence is offence. We can only defend this island effectively against air attacks by offensive measures, by attacking the enemy in his air bases on the Continent and in that way destroying his power of attacking us across the Channel. Information has just come into our possession as to the site of the Gotha aerodromes, and orders for attacking them have already been given. The larger question of our future air offensive will be dealt with in another memorandum.

2 Whitehall Gardens, S.W.
6th Sept. 1917.

APPENDIX VIII

HOME DEFENCE OPERATION ORDERS (September 1918)

By Major-General E. B. Ashmore, C.B., C.M.G., M.V.O., Commanding London Air Defence Area.

OPERATION ORDER No. 30

These orders will come into force at noon on 12th September 1918. They will supersede Operations Order No. 20 and subsequent amendments which will be destroyed.

A. Aeroplane Patrols against Aeroplanes by Night Patrol.

1. On receipt of the order AEROPLANE ATTACK PATROL, machines will go up as quickly as possible, and will patrol on the lines laid down in

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Schedule No. 1. No machines may leave their patrols unless in actual pursuit of an enemy aeroplane, or unless a concentration of lights or A.A. gun-fire leads a pilot to suppose that an enemy aeroplane is in such a concentration.

Machines should get their height over their own aerodromes and then proceed on to their patrol lines.

The G.O.C., VI Brigade, R.A.F., will issue from time to time such orders as are necessary as to the height of the patrols.

Apron Line.

2. Along a line running WINCHMORE HILL RAILWAY STATION—MOSSFORD GREEN CHURCH—VALENCE HOUSE, near BECONTREE HEATH—duc S. to the GREENWICH—DARTFORD main road—ELTHAM PALACE, balloon aprons are installed. Aeroplanes will not cross the apron line at a less altitude than 11,000 feet. Single balloons are installed in St. James's Park and in Kensington Gardens.

Zeppelin Raids during Aeroplane Raids.

3. If a Zeppelin raid should occur at the same time as an Aeroplane raid, the G.O.C., VI Brigade, R.A.F., will order red rockets to be fired from such aerodromes or landing-grounds as he thinks fit. On this signal the highest machine on the patrol in question will climb as high as possible and will remain on his patrol on the look out for Zeppelins.

Recognition Signals.

4. The Recognition Signal of the current colour will be made by our machines under the following circumstances:

- (a) When challenged by searchlight or gun-fire.
- (b) While climbing to, or descending from, patrol below a height of 6,000 feet.
- (c) When flying over areas within range of our guns which are outside the normal patrol zones. The signal will be continuously exhibited when over such areas.
- (d) When uncertain of their position, especially when near the coast.
- (e) When within sight or sound of British lightships.
- (f) When crossing the coast.

The night Challenge and Reply Signals between our aircraft will be made as necessary.

Lights on Aeroplanes.

5. Navigation lights will be lit while climbing or descending from patrol below a height of 6,000 feet or less.

Landing Orders.

6. Machines before landing will fire the Very's Light Signal of the day at a height of 1,000 feet. Should there be an obstruction on the ground which will prevent a machine landing safely, a succession of red lights will be fired from the ground.

Wireless Telephone Control.

7. Squadron Commanders, or their deputies, will control their machines by wireless telephone from their operations rooms, and order concentrations, &c., as required by the tactical situation.

Aeroplane Searchlights.

8. Aeroplane searchlights will only expose their beams when a target is seen or heard. If the visibility is very bad, orders should be given not to expose beams.

Recall Signals.

9. Squadron Commanders will give orders to their lights to blink if they wish to recall their machines.

*B. Aeroplane Patrols against Aeroplanes by Day**Fighting Patrols.*

1. On receiving the order 'Patrol' the Squadrons concerned will go up and patrol on the lines laid down in Schedule II.

As far as possible, machines should get their height and formation over their own aerodromes and then proceed on to their patrol lines.

In the case of No. 143 Squadron, whose patrol runs parallel to No. 141 Squadron's patrol, a height of 4,000 feet and formation will be formed over the aerodrome or its vicinity, and the formation will then proceed to their patrol line via SOUTH ASH landing-ground.

In the case of No. 61 Squadron, whose patrol runs parallel to No. 44 Squadron's patrol, a height of 4,000 feet and formation will be obtained over the aerodrome, and the formation will proceed to their patrol line by way of the railway line running from SOUTHBEND to HORNCHURCH.

2. The G.O.C., VI Brigade, R.A.F., will issue from time to time such orders as are necessary as to the height of patrols.

Artillery Wireless Machines.

3. Artillery Wireless Machines will patrol outside the Outer Barrage, and will send down height of formation, and general observations of anti-aircraft fire, according to the form laid down.

All spark wireless-receiving stations will listen in after 'Readiness', but only heights and movements of Hostile Aircraft will be transmitted to the London Warning Control.

Priority of Action—A.A. Guns and Aeroplanes.

4. During such time as any Hostile Formation is approaching LONDON all A.A. Guns outside the GREEN LINE will normally have priority of action, that is to say while crossing all gun areas any formation of our machines will fly to a flank to give unrestricted action to A.A. Guns. If, however, at any time while the Hostile Formation is crossing these gun areas the Patrol Leader considers he has really favourable opportunity to attack he will do so and A.A. Guns will stop firing.

Inside the GREEN LINE our aeroplanes will always have priority of action,

that is to say, all A.A. Guns will give preference to our machines, and will fire only up to that time when it becomes plain that our machines have seen the enemy and are in a position to attack him.

Attack.

5. Fighting Squadrons will be prepared to attack as soon as possible after the Hostile Formation on its way to LONDON crosses the GREEN LINE.

If on the outward journey, the enemy is in good formation, Patrol Leaders should manœuvre to attack when the guns of the barrage have had an opportunity of breaking up the enemy formation.

Wireless Telephone Control and Ground Signals.

6. All squadrons will act in accordance with wireless telephone orders issued direct by G.O.C., 6th Brigade, R.A.F., through the wireless telephony station at Aperfield Court. In the event of the failure of the wireless telephony at Aperfield Court, Ground Signals will be displayed, as requisite, at any of the positions shown in Schedule IV. These will be regarded as *orders* by Patrol Leaders and isolated machines.

Directing Arrows.

7. In the neighbourhood of LONDON a number of Arrows pointing towards Hostile Aircraft will be displayed. These will be shown only from points where the Hostile Aircraft can actually be seen. The Arrows are to be considered only as giving information to machines in the air, and *not* as orders. The positions of Arrow Stations are set out in Schedule V.

Freedom of Action.

8. It is desired to give the Patrol Leaders in the air as much freedom of action as possible. Orders conveyed from the Ground Signals are based on information which may not be available to the Patrol Leaders. Patrol Leaders must constantly keep in mind the fact that the defence of LONDON itself is the main object. It is probable that the enemy will make feints or take on subsidiary objectives in order to uncover LONDON. Squadron Leaders will, therefore, have to judge for themselves whether small Hostile Formations are worth following to any considerable distance, or whether a part only of our Fighting Formations should be detached to deal with them.

Resume Normal Conditions.

9. When 'TURN IN' is given, all machines must land on their aerodromes if possible, and prepare immediately for further action.

Recognition Signals.

10. The Recognition Signal of the colour current for the day will be made as a Signal to our guns not to fire or to cease fire in that direction.

C. Aeroplane Patrols against Airships by Night

Zeppelin Patrol.

1. In the event of a Zeppelin raid, on receiving the order 'Zeppelin Patrol' the Squadrons concerned will patrol as laid down in Schedule III.

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Aeroplane Searchlights.

2. Aeroplane searchlights will expose their beams when a target is seen or heard. They will also search according to standing instructions in the case of airships which have been previously located to sight or sound, but whose engines are cut off. If the visibility is very bad, orders should be given not to expose.

Action of Machines, &c.

3. The orders contained under (A) paragraphs 1, 4, 5, 6, 7, and 9 above, apply equally in the case of Airship attack by night.

C. HANKEY,
Lieut.-Colonel,
General Staff.

H.Q., L.A.D.A.,
Horse Guards, S.W. 1.
10th September 1918.

SCHEDULE NO. I

The following will be the Aeroplane Patrols against Aeroplanes *by night*:

<i>Squadron.</i>	<i>Patrol.</i>	<i>Course.</i>	<i>To go up from:</i>
39	B	South-eastern corner of BALL'S PARK—NORTH WEALD BASSETT—CRABTREE HILL.	NORTH WEALD BASSETT.
44	C	GREENSTEAD FARM—SUTTON'S FARM.	HAINAULT FARM.
78	D	SOUTH WEALD to lighthouse on south bank of THAMES north of SWANSCOMBE MARSHES.	SUTTON'S FARM.
141	E	Church at SWANSCOMBE—FAWKHAM GREEN—BIGGIN HILL.	BIGGIN HILL.
37	F	South-eastern corner of NORTHEY ISLAND—TIPTREE.	GOLDHANGER.
37	J	HATFIELD PEVEREL—STOW MARIES.	STOW MARIES.
61	G	1 mile south of STOW MARIES—LEIGH—1 mile north of YANTLET CREEK.	ROCHFORD.
112	H	THROWLEY—JUDD'S HILL—WARDEN POINT.	THROWLEY.
50	K	WINGHAM—north end of MARGATE SANDS.	BEKESBOURNE.
143	M	DETLING—MARDEN.	DETLING.

The following Patrols, BX and EX, may be ordered as alternative to the normal Patrols B and E:

39	BX	South-eastern corner of BALL'S PARK—LONDON COLNEY—RUISLIP.	NORTH WEALD BASSETT.
141	EX	BIGGIN HILL—BROOKLANDS.	BIGGIN HILL.

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SCHEDULE NO. II

The following will be the Aeroplane Patrols against Aeroplanes *by day*:

<i>Squadron.</i>	<i>Patrol.</i>	<i>Course.</i>	<i>To go up from:</i>
39	B	South-eastern corner of BALL'S PARK—NORTH WEALD BASSETT—CRABTREE HILL. 4 Artillery Machines patrol over Zones J, N and R.	NORTH WEALD BASSETT. NORTH WEALD BASSETT.
44	C	GREENSTEAD FARM—SUTTON'S FARM.	HAINAULT FARM.
78	D	SOUTH WEALD to lighthouse on south bank of THAMES north of SWANSCOMBE MARSHES.	SUTTON'S FARM
141	E	Church at SWANSCOMBE—FAWKHAM GREEN—BIGGIN HILL. 4 Artillery Machines patrol over Zones V and Z.	BIGGIN HILL. BIGGIN HILL.
37	F	South-eastern corner of NORTHEY ISLAND—TIPTREE.	GOLDHANGER.
37	J	HATFIELD PEVEREL—STOW MARIES.	STOW MARIES.
61	C	<i>vide</i> No. 44 Squadron Patrol.	ROCHFORD.
112	H	THROWLEY—JUDD'S HILL—WARDEN POINT.	THROWLEY.
50	K	WINGHAM—north end of MARGATE SANDS.	BEKESBOURNE.
143	E	<i>vide</i> No. 141 Squadron Patrol.	DETLING.
75	—	Circular patrol round HARWICH, radius 5 miles.	ELMSWELL and HADLEIGH.

SCHEDULE NO. III

The following will be the Aeroplane Patrols against Airships *by night*:

<i>Squadron.</i>	<i>Patrol.</i>	<i>Course.</i>	<i>To go up from:</i>
39	B	South-eastern corner of BALL'S Park—NORTH WEALD BASSETT—CRABTREE HILL.	NORTH WEALD BASSETT.
44	C	GREENSTEAD FARM—SUTTON'S FARM.	HAINAULT FARM.
78	D	SOUTH WEALD to lighthouse on south bank of THAMES, north of SWANSCOMBE MARSHES.	SUTTON'S FARM.
141	E	Church at SWANSCOMBE—FAWKHAM GREEN—BIGGIN HILL.	BIGGIN HILL.
37	F	South-eastern corner of NORTHEY ISLAND—TIPTREE.	GOLDHANGER.
37	J	HATFIELD PEVEREL—STOW MARIES.	STOW MARIES.
61	G	1 mile south of STOW MARIES—LEIGH—1 mile north of YANTLET CREEK.	ROCHFORD.
112	H	THROWLEY—JUDD'S HILL—WARDEN POINT.	THROWLEY.

HOME DEFENCE OPERATION ORDERS 499

SCHEDULE NO. III (*cont.*)

<i>Squadron.</i>	<i>Patrol.</i>	<i>Course.</i>	<i>To go up from:</i>
50	K	WINGHAM—north end of MARGATE SANDS.	BEKESBOURNE.
143	M	DETLING—MARDEN.	DETLING.
75	L	WORMINGFORD—HADLEIGH—ELMSWELL—TIBENHAM—MATTISHALL.	HADLEIGH and ELMSWELL.
51	N	{ MATTISHALL—MARHAM. MARHAM—TYDD ST. MARY. TYDD ST. MARY—ORTON	MATTISHALL. MARHAM. TYDD ST. MARY.

The following Patrols, BX, CX, DX, EX, FX, &c., may be ordered as alternative patrols to the normal Patrols, B, C, D, E, F, &c.:

39	BX	South-eastern corner of BALL'S PARK—LONDON COLNEY—RUISLIP.	NORTH WEALD BASSETT.
44	CX	HAINAULT FARM—HOUNSLOW	HAINAULT FARM.
78	DX	SUTTON'S FARM—WIMBLEDON	SUTTON'S FARM.
141	EX	BIGGIN HILL—BROOKLANDS	BIGGIN HILL.
37	FX	Patrol to be extended north to WORMINGFORD.	GOLDHANGER and STOW MARIES.
50	KX	Patrol to be extended south to WESTENHANGER.	BEKESBOURNE.
143	MX	Patrol to be extended south to CRANBROOK STATION.	DETLING.

SCHEDULE NO. IV

List of Places at which Ground Signals are displayed

ORFORDNESS	HERTFORD	WORMINGFORD
MARTLESHAM	BRAINTREE	BIGGIN HILL
STUTTON	HENDON	DETLING
PLOUGH CORNER	NORTHOLT	THROWLEY
BLACKHEATH	SUTTON'S FARM	BEKESBOURNE
EASTHORPE	ROCHFORD	WYE
GOLDHANGER	NORTH BENFLEET	DOVER
BROOMFIELD	ORSETT	PENSHURST
SAWBRIDGEWORTH	ALLHALLOWS	MARDEN
FYFIELD	HOUNSLOW	LEIGH GREEN
NORTH WEALD BASSETT	GROVE PARK	LYMPNE
LONDON COLNEY	MANSTON	LYDD
STOW MARIES	CROYDON	RYE
BURNHAM	SOUTH ASH	SWINGFIELD
SHENFIELD	KENLEY COMMON	KING'S HILL
HAINAULT FARM	SOLE STREET	NEW CHAPEL
GULTON	FRINSTED	RUNWELL
HARTY	EDGWARE	SIBLE HEDINGHAM
PLUCKLEY	HADLEIGH	

500 HOME DEFENCE OPERATION ORDERS

SCHEDULE NO. V

LIST OF DIRECTION ARROW POSITIONS

Inner London A.A. Defences

LETCHMORE	DARTFORD	BANSTEAD
PARNDON	HALSTEAD	ADDINGTON
THEYDON	SIDCUP	ESHER
LITTLEHEATH	BELVEDERE	STREATHAM
TEMPLE	HORSENDON	HYDE PARK
WARE	HOUNSLOW	FINCHLEY
STIFFORD	LANGLEY	WANSTEAD
THORNDON		

Redhill A.A. Defences

REDHILL
IDE HILL
CHART

St. Albans A.A. Defences

HARPENDEN
DATCHWORTH

Chelmsford A.A. Defences

BILLERICAY	MATCHING
HIGHWOOD	OAK FARM
HADHAM	

Thames and Medway A.A. Defences

CHALK	HARVEL
IGHTHAM	

OPERATION ORDER No. 31

These orders will come into force at noon on the 12th September 1918. They will supersede Operation Order No. 21, and subsequent amendments, which will be destroyed.

Control

1. Information of Hostile Aircraft comes into the London Warning Control.

Orders for 'READINESS' and 'OPERATIONS' are issued direct from there to A.A. Defences and the Royal Air Force Squadrons.

Orders for 'PATROL' are issued by VI Brigade, R.A.F., on instructions received from L.A.D.A.

Limits of Outer London Barrage.

2. The Outer London Barrage comprises the following gun stations:

- | | | |
|-----|------------------------------|---|
| (a) | A.A.D.C., CHELMSFORD | COALHOUSE to HADHAM. |
| (b) | „ ST. ALBANS | BATSHAM to CHALFONT ST. PETER. |
| (c) | „ STAINES | GERRARDS CROSS to WOTTON (excluding FARNBOROUGH, NEWHAVEN, and PORTSLADE Defences). |

HOME DEFENCE OPERATION ORDERS 501

- (d) A.A.D.C., REDHILL WESTCOTT to SOUTHWOOD.
(e) ,, THAMES and MEDWAY . ALL guns as far East as ALLHALLOWS inclusive.

The Green Line.

3. The inner limit of fire of the Outer London Barrage is called the GREEN LINE, and runs SHENFIELD RAILWAY STATION—HIGH ONGAR CHURCH—WARE—ST. ALBANS—KING'S LANGLEY—UXBRIDGE—WEYBRIDGE—EFFINGHAM—N.W. CORNER OF CHEVENING PARK—HARTLEY—ORSETT—SHENFIELD RAILWAY STATION.

Intelligence.

4. All intelligence will be passed direct to the London Warning Control by A.A. Controls and Nos. 39, 44, 78, 141, 37, 61, 143, 112, and 50 Squadrons, R.A.F., and will be repeated by the London Warning Control to such A.A. Controls and squadrons as may be concerned.

Intelligence will be passed between Nos. 75 and 51 Squadrons, R.A.F., and the London Warning Control through VI Brigade, R.A.F.

A. Aeroplane Attack by Night

Patrols and Guns. Certain Guns restricted

1. When our own machines are not up, all guns in the L.A.D.A., without exception, will fire to sight and sound.

2. When our own machines are ordered up on patrol, information will be passed to A.A. Commands concerned; certain guns, as shown below, will be restricted in firing to sound. All other guns will fire to sound without restriction, and all guns without exception will fire to sight.

- (i) B, C, D, E, EX, F, J and M Patrols entail no restrictions from firing to sound.
- (ii) When BX Patrol is ordered up:
LITTLEHEATH Gun will only fire from true bearing 60° to 250° .
WATFORD Gun will only fire from true bearing 190° to 50° .
- (iii) When G Patrol is ordered up:
CANVEY Guns will only fire from true bearing 145° to 25° .
ALLHALLOWS Gun will only fire from true bearing 100° to 325° .
WHITEHOUSE FARM Guns will only fire from true bearing 20° to 280° .
PORT VICTORIA Guns will only fire from true bearing 50° to 300° .
- (iv) When H Patrol is ordered up:
JUDD'S HILL and HARTY HILL Guns will be completely restricted.
CONYER Gun will only fire from true bearing 180° to 0° .
EASTCHURCH Gun will only fire from true bearing 260° to 330° .
GRAVENEY Gun will only fire from true bearing 20° to 180° .
WHITSTABLE Guns will only fire from true bearing 350° to 210° .
BOUGHTON Gun will only fire from true bearing 340° to 210° .
- (v) When K Patrol is ordered up:
HENGROVE Gun will only fire from true bearing 345° to 210° .
CLIFFSEND Gun will only fire from true bearing 350° to 230° .
RICHBOROUGH Gun will only fire from true bearing 0° to 210° .

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Heights of Enemy Machines.

3. Up to the present 10,000 to 12,000 feet has included heights at which enemy machines normally fly at night.

Searchlights.

4. Fighting and linking lights will only expose their beams when a target is seen or heard. In Central and West London Defences searchlights may show out otherwise than to sight or sound during barrage fire. If the visibility is very bad orders should be given not to expose.

Fire to Sound.

5. If the searchlight fails to pick up the target by the time the Gun Commander judges it to be nearly entering his barrage zone he will open barrage fire (in the case of the 3-inch 20-cwt. guns with reduced charge), on the principles indicated in these orders, but the light will continue to search in the area of the shell bursts during barrage fire.

Star or A.Z. Shell.

6. One Star (or A.Z.) shell may be fired as an indication of the first round of a barrage to sound. It may be fired regardless of areas over which the firing of the A.Z. shell is restricted.

Guns observing the one signal round of Star (or A.Z.) shell will stand by to open support barrage fire in accordance with the scheme in force.

Barrage Fire.

7. Barrages will be fired at the predicted angle and bearing, allowing for *temps mort*, at the ballistic height ordered. Vertical distribution should be given by changing the Q.E. between each round. Lateral distribution will be given by traverses on either side of the predicted bearing.

Suitable Q.E.s and fuses should be selected to give effect at the ballistic height ordered.

All sights and deflexion scales should be put at zero.

Barrage fire should normally be for 1 to 1½ minutes and then listen, varying the duration of fire.

The rate of fire should not exceed 15 rounds a minute.¹

Unsupported fire to sound should only be employed in cases of isolated defences, or when the direction of the target is such that it only comes within the range of one gun of a group.

Machine-guns.

8. In view of possible attack by low-flying enemy machines, machine-guns have been installed at various points in the London, Thames and Medway, Dover and Harwich Areas. These guns will be manned by night.

¹ The rate of fire for 18-pr. guns may be increased to 25 rounds per minute in the following cases:

Single line of gun stations in the Outer London Barrage—St. Albans, Staines, and Redhill A.A. Defences.

Isolated A.A. Defences:

Harwich A.A. Defences—Pulham.

Staines A.A. Defences—Farnborough and Newhaven.

Fire should only be opened on machines under 4,000 feet high:

- (a) Which are definitely recognized by sight as hostile.
- (b) To sound, at machines which are committing hostile acts.

No machine-gun will be fired at a less elevation than 40° . A proportion of tracer ammunition will be used.

Aeroplane Recall Signal.

9. A.A.D.C.s will order their lights to blink, as required, as a Recall Signal to our machines.

B. Aeroplane Attack by Day

Priority of Action—A.A. Guns and Aeroplanes.

1. During such time as any hostile formation is approaching LONDON all A.A. Guns outside the GREEN LINE will normally have priority of action, that is to say, while crossing all gun areas any formation of our machines will fly to a flank to give unrestricted action to A.A. Guns. If, however, at any time while the Hostile Formation is crossing these gun areas the Patrol Leader considers he has a really favourable opportunity to attack he will do so and A.A. Guns will stop firing.

Inside the GREEN LINE our aeroplanes will always have priority of action, that is to say, all A.A. Guns will give preference to our machines and will fire only up to that time when it becomes plain that our machines have seen the enemy and are in a position to attack him.

2. Guns will fire to sight only. Heights will be assumed at 16,000 feet in default of an ascertained height or observation of fire.

3. Guns will fire two signal rounds H.E. full charge (at the longest fuse setting and with Q.E. to reach appropriate height) in the direction of enemy aircraft which are out of range and are not being fired at by other guns.

C. Airship Attack by Night

Searchlights.

1. Fighting and linking lights will expose their beams when a target is seen or heard. They will also search according to standing instructions in the case of airships which have been previously located to sight or sound, but whose engines are cut off.

A.Z. and Star Shell.

2. A.Z. Shell will be used when firing to sight or sound, except over certain populous or dangerous areas to which restrictions have been applied. Over such areas only H.E. Shell (full charge) will be fired. One Star (or A.Z.) Shell may be fired as a signal round for barrage fire, regardless of the above restrictions.

Patrols and Guns: Certain Guns restricted.

3. In addition to the above restrictions as to A.Z. Shell, the following guns are restricted from firing to sound as shown:

When the Patrols named in A 2 (ii), (iii), (iv), and (v) are ordered up, the restrictions for firing to sound laid down in those paragraphs hold good.

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In addition the following restrictions to sound will be observed:

(i) When CX or DX Patrols are ordered up:

All Guns inside the GREEN LINE will be completely restricted.

(ii) When KX Patrol is ordered up:

WESTENHANGER Gun will be completely restricted.

The remainder of the Patrols (B, C, D, E, EX, F, FX, J, L, M, and MX) entail no restrictions from firing to sound.

All A.A.D.C.s and Mobile Brigades concerned will be informed when Patrols are ordered up, so that the necessary restrictions in firing to sound may be ordered.

All other guns will fire to sound without restriction, and all guns will fire to sight without exception.

Fire to Sound.

4. The instructions laid down in *A*, paragraphs 5 and 6, apply equally in the case of airships, except that all guns will fire ammunition with full charge.

Barrage Fire.

5. Barrages will be fired at the predicted angle and bearing, allowing for *temps mort*. Fire should be opened with A.Z. or (in the case of restricted arcs) H.E. ammunition, at a fixed Q.E., using appropriate fuses to give vertical distribution between the ballistic heights ordered.

The Q.E. at which barrage fire is opened should not be less than 70° for 3-inch 20-cwt. guns. In the case of 18-prs. and 13-pr. 9-cwt. guns, the maximum Q.E. should be used. The limits of ballistic height are 16,000 to 20,000 feet.

Lateral distribution may be extended to 10° on either side of the predicted bearing.

All sights and deflexion scales should be put at zero.

Duration of Barrage.

6. The rate of fire will not exceed 10 rounds per minute. The duration of fire will be for one minute, then listen, varying the duration of fire.

Firing to Sight—Assumed Height.

7. In default of definite information the height of Zeppelins should be assumed as 18,000 feet, but fire should be opened at lower angles of sight at assumed heights of 17,000 feet and 16,000 feet.

Aeroplane Recall Signal.

8. The instructions in *A*, paragraph 9 above, apply.

C. HANKEY,
Lieut.-Colonel,
General Staff.

H.Q., L.A.D.A.,
Horse Guards, S.W. 1.

10th September 1918.

APPENDIX IX

ANTI-AIRCRAFT DEFENCES IN GREAT BRITAIN AT THE ARMISTICE
TABLE 'A'. GROUND DEFENCES*

Area.	No. of Sub-Commands.	No. of A.A. Companies.	Total armament.			Personnel.			Total.
			Guns.	Search-lights.	Height finders.	H.Q.	Guns.	Search-lights.		Height finders.
London Air Defence Area.	11 Sub-Commands	39 (including 1 Signal Coy.)	250	388	114	1,019	3,458	450	8,031
	2 Mobile Brigades + 3 Mobile Batteries	9 Mobile Batteries	54	27	..	200	756	216 (Drivers)	1,307
Northern Air Defence Area.	8	29	176	291	131	685	2,413	423	5,777
Total.	19 Sub-Commands 2 Mobile Brigades + 3 Mobile Batteries	68 (including 1 Signal Coy.) 9 Mobile Batteries	480	706	245	1,904	6,627	1,089	Grand Total: 15,115

* Excluding listening posts, chiefly manned by the police. All the figures quoted are establishment figures. The actual figures are not available.

APPENDIX IX (*cont.*)

TABLE 'B'. HOME DEFENCE SQUADRONS

(*Operational Units of the VI Brigade.*)

Brigade Head-quarters.

Horse Guards Parade,
London.

Southern Group (H.Q. London)

(Allotted to London Air Defence Area)

47th Wing (H.Q. Trumpington, Cambridge).	No. 51 Squadron (F.E.2b) (H.Q. Marham, Norfolk) <div style="margin-left: 40px; margin-top: 10px;"> <table style="width: 100%; border: none;"> <tr> <td style="border: none; text-align: center;"> </td> <td style="border: none; text-align: center;"> </td> <td style="border: none; text-align: center;"> </td> </tr> <tr> <td style="border: none; text-align: center;">'A' Flight (Mattishall, Norfolk)</td> <td style="border: none; text-align: center;">'B' Flight (Tydd St. Mary, Lincs.)</td> <td style="border: none; text-align: center;">'C' Flight (Marham, Norfolk)</td> </tr> </table> </div>				'A' Flight (Mattishall, Norfolk)	'B' Flight (Tydd St. Mary, Lincs.)	'C' Flight (Marham, Norfolk)						
'A' Flight (Mattishall, Norfolk)	'B' Flight (Tydd St. Mary, Lincs.)	'C' Flight (Marham, Norfolk)											
49th Wing (H.Q. Upminster, Essex).	No. 39 Squadron (Bristol Fighter) North Weald Bassett, Essex. No. 44 Squadron (Camel) . . . Hainault Farm, Romford, Essex. No. 78 Squadron (Camel) . . . Sutton's Farm, Hornchurch, Essex. No. 141 Squadron (Bristol Fighter) Biggin Hill, Kent.												
50th Wing (H.Q. Great Bad-dow, Chelmsford, Essex).	No. 37 Squadron (Camel) (H.Q. Stow Maries, Essex) <div style="margin-left: 40px; margin-top: 10px;"> <table style="width: 100%; border: none;"> <tr> <td style="border: none; text-align: center;"> </td> <td style="border: none; text-align: center;"> </td> <td style="border: none; text-align: center;"> </td> </tr> <tr> <td style="border: none; text-align: center;">'A' Flight (Stow Maries, Essex)</td> <td style="border: none; text-align: center;">'B' Flight (Stow Maries, Essex)</td> <td style="border: none; text-align: center;">'C' Flight (Goldhanger, Essex)</td> </tr> </table> </div> No. 61 Squadron (Camel) . . . Rochford. No. 75 Squadron (Avro) (H.Q. Elmswell, Bury St. Edmunds, Suffolk) <div style="margin-left: 40px; margin-top: 10px;"> <table style="width: 100%; border: none;"> <tr> <td style="border: none; text-align: center;"> </td> <td style="border: none; text-align: center;"> </td> <td style="border: none; text-align: center;"> </td> </tr> <tr> <td style="border: none; text-align: center;">'A' Flight (Hadleigh, Suffolk)</td> <td style="border: none; text-align: center;">'B' Flight (Elmswell, Suffolk)</td> <td style="border: none; text-align: center;">'C' Flight (Elmswell, Suffolk)</td> </tr> </table> </div>				'A' Flight (Stow Maries, Essex)	'B' Flight (Stow Maries, Essex)	'C' Flight (Goldhanger, Essex)				'A' Flight (Hadleigh, Suffolk)	'B' Flight (Elmswell, Suffolk)	'C' Flight (Elmswell, Suffolk)
'A' Flight (Stow Maries, Essex)	'B' Flight (Stow Maries, Essex)	'C' Flight (Goldhanger, Essex)											
'A' Flight (Hadleigh, Suffolk)	'B' Flight (Elmswell, Suffolk)	'C' Flight (Elmswell, Suffolk)											
53rd Wing (H.Q. Harrietsham, Maidstone, Kent).	No. 50 Squadron (Camel) . . . Bekesbourne, Canterbury, Kent. No. 112 Squadron (Camel) . . . Throwley, Faversham, Kent. No. 143 Squadron (Camel) . . . Detling, Maidstone, Kent.												

No. 7 Balloon (Apron) Wing (H.Q. Chingford, Essex).	No. 1 Balloon Squadron . . . Barking, Essex.
	No. 2 Balloon Squadron . . . Woodford, Essex.
	No. 3 Balloon Squadron . . . Shooter's Hill (S.E. London).

Northern Group (H.Q. Leeds)
(Allotted to Northern Air Defence Area)

46th Wing (H.Q. York).	No. 36 Squadron (Bristol Fighter) (H.Q. Usworth, Sunderland)						
	<table border="0" style="width: 100%; text-align: center;"> <tr> <td style="width: 33%;"> </td> <td style="width: 33%;"> </td> <td style="width: 33%;"> </td> </tr> <tr> <td>'A' Flight (Usworth, Sunderland)</td> <td>'B' Flight (Ashington, Morpeth, Northumberland)</td> <td>'C' Flight (Seaton Carew, West Hartlepool)</td> </tr> </table>				'A' Flight (Usworth, Sunderland)	'B' Flight (Ashington, Morpeth, Northumberland)	'C' Flight (Seaton Carew, West Hartlepool)
	'A' Flight (Usworth, Sunderland)	'B' Flight (Ashington, Morpeth, Northumberland)	'C' Flight (Seaton Carew, West Hartlepool)				
	No. 76 Squadron (Avro) (H.Q. Ripon, Yorks.)						
	<table border="0" style="width: 100%; text-align: center;"> <tr> <td style="width: 33%;"> </td> <td style="width: 33%;"> </td> <td style="width: 33%;"> </td> </tr> <tr> <td>'A' Flight (Copmanthorpe, Yorks.)</td> <td>'B' Flight (Helperby, Yorks.)</td> <td>'C' Flight (Catterick, Yorks.)</td> </tr> </table>				'A' Flight (Copmanthorpe, Yorks.)	'B' Flight (Helperby, Yorks.)	'C' Flight (Catterick, Yorks.)
'A' Flight (Copmanthorpe, Yorks.)	'B' Flight (Helperby, Yorks.)	'C' Flight (Catterick, Yorks.)					
No. 77 Squadron (Avro) (H.Q. Penston, East Lothian)							
<table border="0" style="width: 100%; text-align: center;"> <tr> <td style="width: 33%;"> </td> <td style="width: 33%;"> </td> <td style="width: 33%;"> </td> </tr> <tr> <td>'A' Flight (Whiteburn, Berwickshire)</td> <td>'B' Flight (Penston, East Lothian)</td> <td>'C' Flight (Penston, East Lothian)</td> </tr> </table>				'A' Flight (Whiteburn, Berwickshire)	'B' Flight (Penston, East Lothian)	'C' Flight (Penston, East Lothian)	
'A' Flight (Whiteburn, Berwickshire)	'B' Flight (Penston, East Lothian)	'C' Flight (Penston, East Lothian)					
48th Wing (H.Q. Gains- borough, Lincs.).	No. 33 Squadron (Avro) (H.Q. Kirton Lindsey, Lincs.)						
	<table border="0" style="width: 100%; text-align: center;"> <tr> <td style="width: 33%;"> </td> <td style="width: 33%;"> </td> <td style="width: 33%;"> </td> </tr> <tr> <td>'A' Flight (Scampton, Lincs.)</td> <td>'B' Flight (Kirton Lindsey, Lincs.)</td> <td>'C' Flight (Elsham, Lincs.)</td> </tr> </table>				'A' Flight (Scampton, Lincs.)	'B' Flight (Kirton Lindsey, Lincs.)	'C' Flight (Elsham, Lincs.)
'A' Flight (Scampton, Lincs.)	'B' Flight (Kirton Lindsey, Lincs.)	'C' Flight (Elsham, Lincs.)					
No. 90 Squadron (Avro) (H.Q. Buckminster, Lincs.)							
<table border="0" style="width: 100%; text-align: center;"> <tr> <td style="width: 33%;"> </td> <td style="width: 33%;"> </td> <td style="width: 33%;"> </td> </tr> <tr> <td>'A' Flight (Leadenham, Lincs.)</td> <td>'B' Flight (Buckminster, Lincs.)</td> <td>'C' Flight (Wittering, Northants.)</td> </tr> </table>				'A' Flight (Leadenham, Lincs.)	'B' Flight (Buckminster, Lincs.)	'C' Flight (Wittering, Northants.)	
'A' Flight (Leadenham, Lincs.)	'B' Flight (Buckminster, Lincs.)	'C' Flight (Wittering, Northants.)					

Note. The war establishment of the home defence squadrons set out above was: officers, 576, other ranks, 3,548, and women, 448.

The war establishment of No. 7 Balloon Wing was 120 officers and 3,475 other ranks.



APPENDIX X

STATISTICS FOR THE TRAINING BRIGADE IN EGYPT, 1918

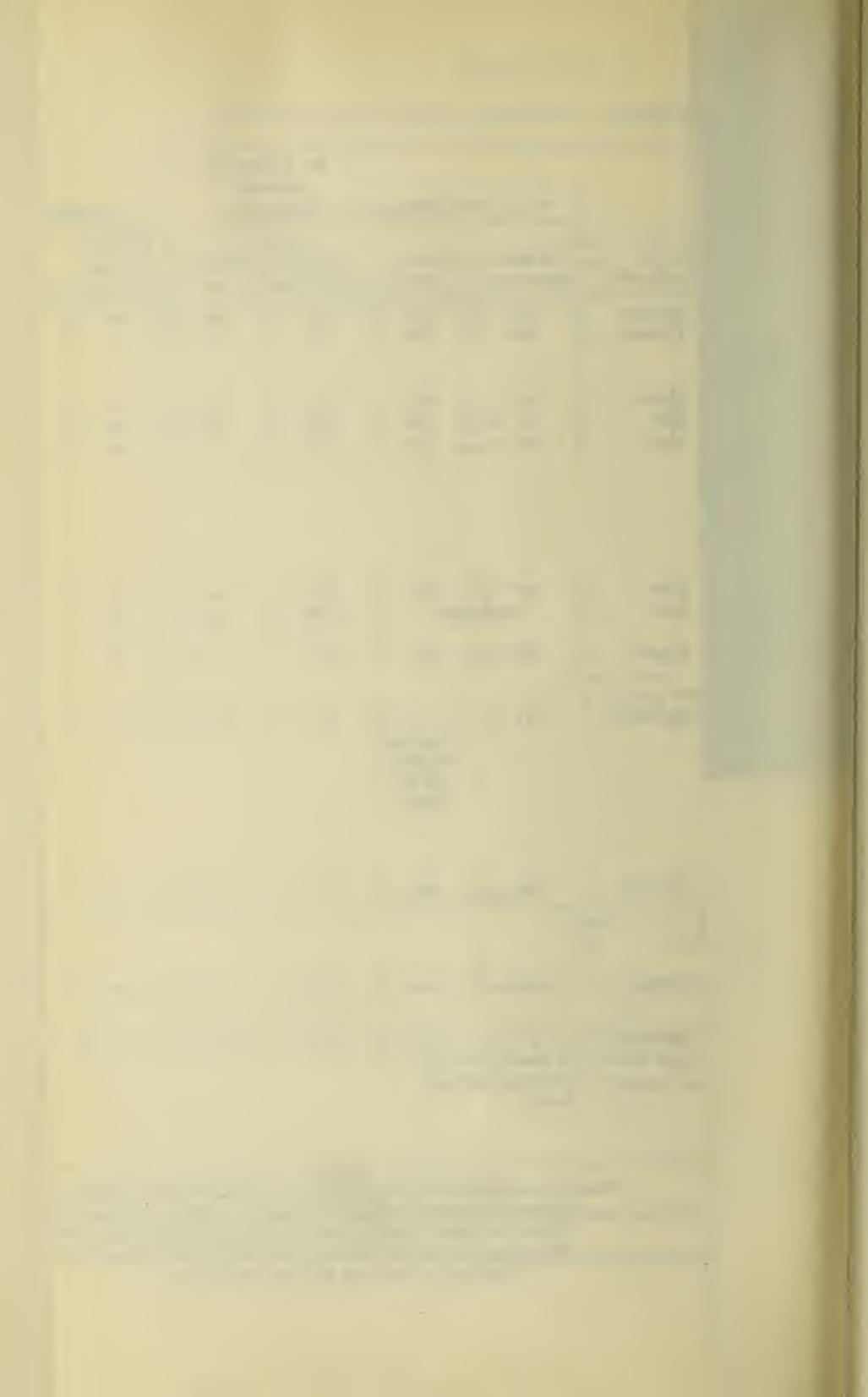
Month.	No. 3 Cadet Wing.		No. 3 School of Military Aeronautics.		20th Training Wing.			32nd Training Wing.			38th Training Wing (pupils passed through).					69th Training Wing.		Remarks.	
	Under instruction.	Passed out.	Under instruction.	Passed out.	Qualified to wear wings.	Graduated.	Hours flown.	Qualified to wear wings.	Graduated.	Hours flown.	School of Aerial Gunnery.	Aerial Fighting School.	Artillery Observation School.	Flying Instructors' School.	School of Navigation and Bomb-dropping.	Graduated.	Hours flown.		
January	542	172	550	205	21	65	3,707	11	53	3,077	87	32	* First pilots course, end of January. First observers course, February.
February	486	86	545	289	25	62	2,871	18	52	2,675	93	43	33*	..	..	..	..	..
March	500	205	659	219	24	54	3,609	44	61	3,602	80	43	68	..	..	..	..	..
April	501	87	604	216	39	70	3,776	33	51	3,402	105	46	61	..	..	..	..	..
May	547	91	635	319	42	72	4,411	36	68	4,490	88	49	60	..	Formed in May 1918 but work for the early period consisted of lectures. First aeroplanes arrived end of June when formation flights started. School moved to Helwan 19. 8. 18, but no figures are available before Sept.	..	..
June	440	211	636	224	35	66	3,675	45	65	3,870	110	55	65	† 69th Training Wing formed with effect from 21. 7. 18.
July	No figures	..	689	251	36	85	4,039	52	80	3,505	92	56	80	..	..	126†	934	..
August	362	205	750	251	28	144	4,085	43	122	2,782	109	57	89	..	..	102	2,710	..
September	411	2 (Moving to Abu Qir in Sept.)	560	262	37	148	3,768	27	159	2,731	..	64†	68	11‡	14	135	No figures	..	
October	707	341	721	291	55	118	3,948	76	109	3,075	..	97	55	No figures	14	97	2,782	..	
Total	4,496	1,400	6,349	2,527	342	884	37,889	385	820	33,209	No. 5 Fighting School 161	A.F.S. 381	579	11	28	460	6,426	..	
Average per month	511 (8 months average omitting July and Sept.)	175	635	253	34	88	3,789	38	82	3,321	S. of A.G. 97	A.F.S. 48	68 (8 months' average omitting February)	11	14	111 (3 months' average omitting July)	2746 (2 months' average omitting July and Sept.)	..	

Note. Cadets passed from the Cadet Wing to No. 3 School of Military Aeronautics, which also received officer pupils direct.

Of those shown as 'graduated' in the 20th, 32nd, and 69th Training Wings, some returned to England for final instruction before qualifying to wear wings.

Others, as shown, qualified in Egypt and the majority were used to reinforce Middle East air detachments.

The pupils for gunnery, fighting, and navigation and bomb-dropping, in the 38th Wing, were received into that Wing from the 20th, 32nd, and 69th Wings, after qualification. Pupils for the Artillery Observation School had, for the most part, passed through the School of Military Aeronautics.



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Abbreviations

A.A. = Anti-Aircraft
 B. = Battleship
 B.Cr. = Battle Cruiser
 Br. = British
 Cmdre. = Commodore
 Commr. = Commander
 Cr. = Cruiser
 Flt. = Flight
 Fr. = French
 Ger. = German

H.D. = Home Defence
 L.Cr. = Light Cruiser
 Ldg. Mech. = Leading Mechanic
 Mon. = Monitor
 R. = Reserve
 Sqdn. = Squadron
 N.T. = Night Training
 S/M. = Submarine
 T. = Training
 T.B.D. = Destroyer

W/T. = Wireless Telegraphy

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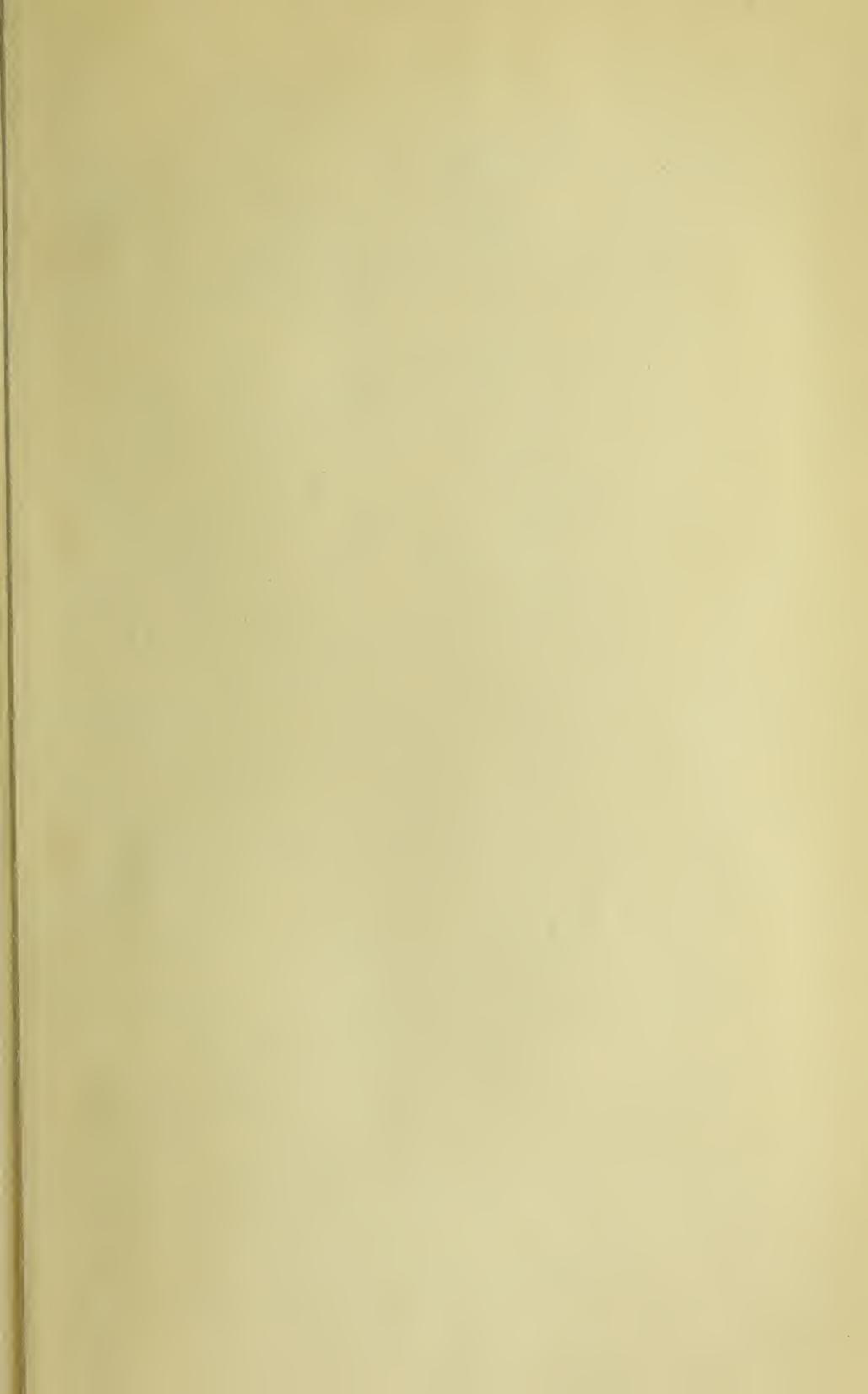
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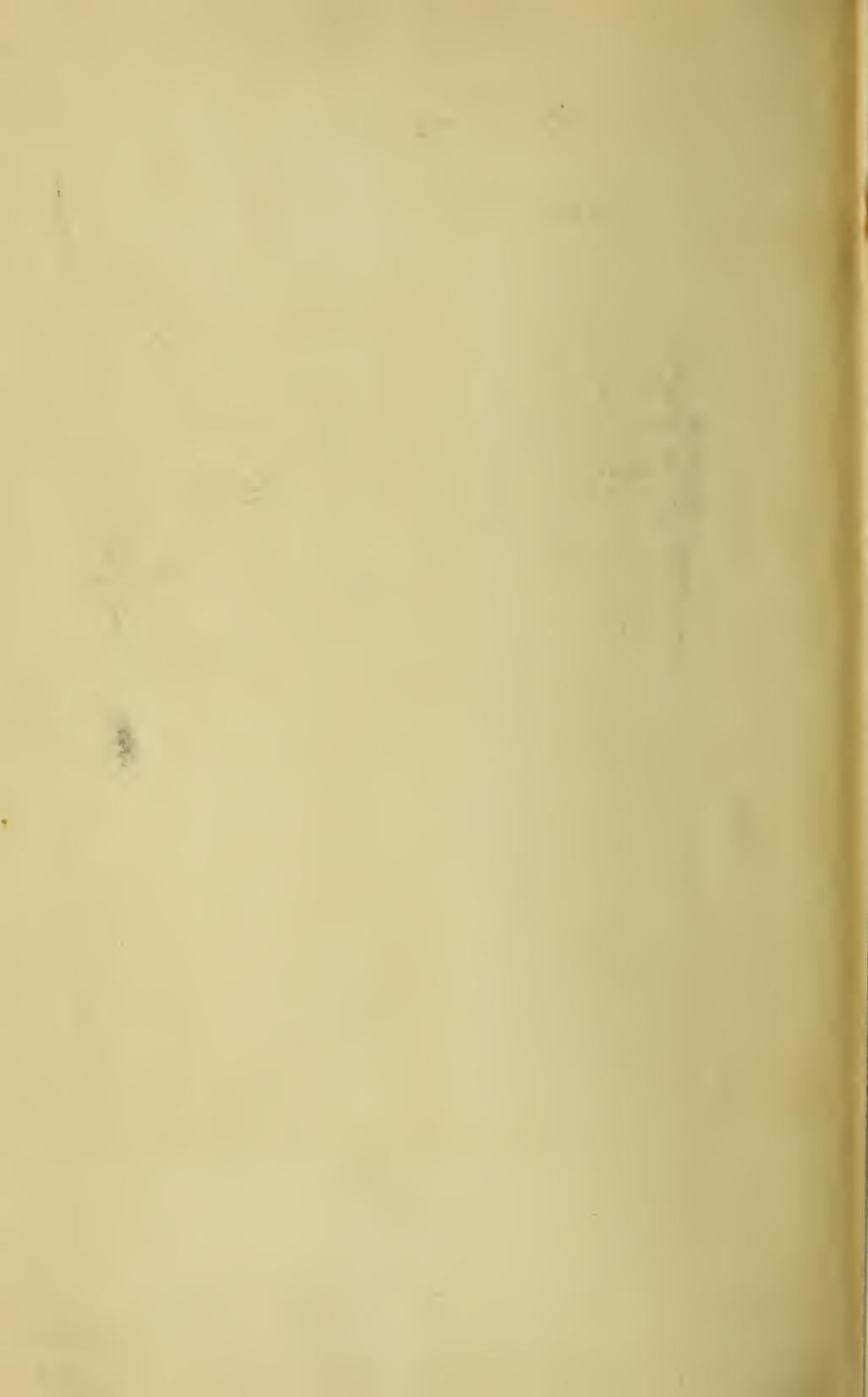
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