



MASTERS OF WAR: THE AIF IN FRANCE 1918

ONE-DAY CONFERENCE SATURDAY 14 APRIL 2018
POMPEY ELLIOTT MEMORIAL HALL
403 CAMBERWELL ROAD, CAMBERWELL

KEYNOTE SPEAKER – CHRIS CLARK
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14 APRIL 2018

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Air Power and the Australian Corps in 1918

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During the First World War the use of aircraft in military and naval operations went from being theoretical and experimental to a new and important dimension of warfare. By the time of the Armistice, the technological, organisational and theoretical foundations of modern air power had been well and truly laid and indeed, aviation had established itself as not only an important component of combined arms surface operations but also as a means of projecting force at the strategic level of warfighting.

Australia played a relatively minor role in air power's extraordinary evolution during this period: Australian airmen were relatively few in number and the handful of aviation units raised by the Commonwealth were both reliant on and subordinate to the British Army's Royal Flying Corps (RFC – and the Royal Air Force following its establishment in April 1918). Nevertheless, aviation figured in the Australian experience of war in ways that reflected air power's growing importance in battlefield operations and with relevance to the Commonwealth's post-war defence plans.¹

In keeping with the conference's themes, this paper examines the role that air power played in the Australian Corps' operations on the Western Front in 1918. It uses some examples from the Australian Corps' application of air power in 1918 to make two points. The first is that, by the war's final year, aviation had developed from the experimental and peripheral role it had in 1914 to occupy an important place in the planning and execution of operations; aircraft were not decisive battle winning weapons in themselves but they became,

¹ For the most comprehensive study of Australia's involvement in the air war see Michael Molquentin, *Australia and the War in the Air*, Oxford University Press, Melbourne, 2014.

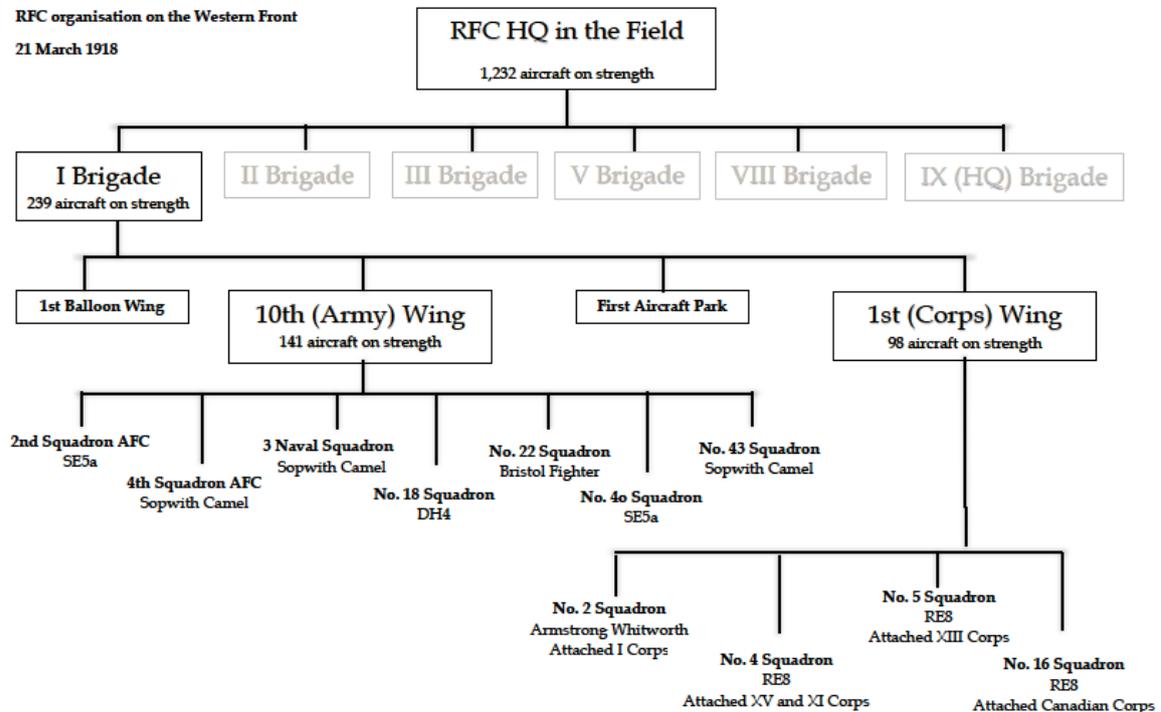
through a variety of air power roles, integral to combined arms land warfare. Secondly, in the Australian Corps' experience of air power in 1918, we perceive some of the difficulties faced by the AIF - and the British Army more broadly - in the transition from stalemate to mobile operations. During 1918 air power demonstrated itself to possess an inherent responsiveness and flexibility that made it a potent weapon in fluid, mobile operations. Even so, the efficacy of tactical air support declined in some respects during the war's final six months as operations made the transition from carefully planned set-piece battles to more fluid and faster tempo operations. In this respect this paper attempts to add nuance to the well-established notion that the British Army evolved along a learning curve during the Great War.² As this study demonstrates, at least in the case of air power, the process of learning was neither sustained nor linear: the learning, unlearning, adapting and planning for the future went on until the Armistice.

The Australian Corps and Air Power

Organisationally the army corps of the BEF derived their air support from three distinct sources. Most directly, each corps had on its order of battle a squadron of the Royal Flying Corps equipped with two-seater reconnaissance aircraft. Known as 'corps squadrons', these units operated under the command of the RFC but were effectively controlled by the headquarters of their respective army corps to provide its units with tactical support on the battlefield. Typically this involved spotting fire for the corps' heavy artillery and producing reconnaissance photographs of the battlefield. At a broader level, corps had the support of the RFC's fighter and bomber squadrons, though these were controlled at the level of army

² See, for example, Brian Bond (ed), *Look to Your Front: Studies in the First World War by the British Commission for Military History*, Spellmount, Staplehurst, 1999; Gary Sheffield, *Forgotten Victory: The First World War, Myths and Realities*, Review, London, 2001; P. Griffith, *Battle Tactics of the Western Front: The British Army's Art of Attack, 1916-18*, Yale University Press, New Haven, 1994; Andy Simpson, *Directing Operations: British Corps Command on the Western Front*, Spellmount, Stroud, 2006.

headquarters. Above this, GHQ also had a strategic reserve of fighters, bombers and long-range reconnaissance aircraft that it could allocate where needed.



This organisational structure reflected an ethos of air power that had evolved in the RFC during the first half of the Great War.³ On the one hand, it emphasised the RFC's identity as a corps of the British Army and saw its role as supporting army operations. On the other hand, it perceived the aeroplane as an inherently offensive weapon – one that, when employed aggressively, could secure control of the air space over the battlefield to enable effective tactical support for ground forces while also undermining the morale of the enemy. Indeed, the long range bombing and incessant fighter patrolling undertaken by the RFC's 'army squadrons', deep behind German lines, was intended to secure the 'corps squadrons'

³ James Pugh, *The Royal Flying Corps, the Western Front and the control of the air, 1914-1918*, Routledge, Abingdon, 2017, pp. 42-70.

the freedom to operate over the battlefield and provide the army corps with effective tactical support.

During 1916 and 17 I and II ANZAC Corps had worked with British corps squadrons but with the establishment of the Australian Corps in November 1917, the RFC provided it 3rd Squadron of the Australian Flying Corps. This unit, raised at Point Cook in Victoria in 1916 and only recently arrived on the Western Front, would serve on the Australian Corps' order of battle until shortly before the Armistice. Organised along standard RFC lines, 3rd Squadron comprised about 200 personnel, most of them technical ground staff, and it operated 18 RE8 aircraft, each crewed by a pilot and an observer. The squadron's headquarters had liaison personnel from Australian Corps HQ, including staff to facilitate photography, intelligence gathering and counter-battery fire. Third Squadron also provided a detached unit of wireless operators to work in the field with the corps' heavy artillery.

Air support in trench warfare

By late-1917 the tactics, technology and administration that underpinned tactical air support had been fine-tuned by three years of largely static trench warfare. In regular periods of holding the line, such as that done by the Australian Corps in Flanders over the winter of 1917-18, corps squadrons typically devoted two thirds of their resources to artillery cooperation and a majority of their flying hours. Indeed, around three quarters of the sorties that 3rd Squadron flew between 1 January and 31 March 1918 were to direct the fire of the Australian Corps' heavy guns.⁴

⁴ 3rd Squadron war diaries, January-March 1918, AWM4 8/6/13 Part 1 to 8/6/15 Part 2. In January, February and March, 3rd Squadron flew 656 operational (ie not tests, practices etc) sorties. Of these 477 were artillery co-operation flights, either destructive shoots (219) or artillery patrols (258).

Approximately half of these artillery cooperation sorties were planned and organised by the Australian Corps' Counter-Battery Staff Office (CBSO).⁵ Each evening it issued a program of targets to the corps' siege batteries and to 3rd Squadron to engage the following day. In fine weather, an efficient corps squadron could complete a dozen so of these so-called 'destructive shoots', each one observing and correcting the aim of around 300 rounds.⁶ The static predictability of trench warfare allowed this system to reach peak efficiency by early 1918.⁷ The airmen and the gunners knew the location of each other and the targets they had been assigned, making the observation and correction of indirect artillery fire using one way Morse code transmitters in the aircraft, a typically straightforward process. Indeed, despite inclement weather, during the first three months of 1918 3rd Squadron assisted the Australian Corps' gunners in engaging 179 German batteries.⁸

Artillery patrols represented the balance of 3rd Squadron's efforts to support the Australian Corps' gunners during periods of trench warfare. RFC policy stipulated that corps squadrons should keep at least one machine in the air over its corps' frontage throughout daylight hours to spot active German batteries or other targets of opportunity. Using the 'zone call' system, pilots could spontaneously direct the corps' heavy artillery onto any targets they spotted during their patrols. Although British staff had devised this system in 1916 in anticipation of the resumption of open warfare it had, ironically, proved to be highly effective in trench warfare when the location of a corps' heavy guns remained static for extended

⁵ Albert Palazzo, 'The British Army's Counter-Battery Staff Office and control of the enemy in World War I', *The Journal of Military History*, volume 63, number 1, 1999, 55-74.

⁶ 'Aerial Tactics', notes prepared by No. 1 School of Aeronautics, Redding, November 1918, NAUK AIR1/161/15/123/4.

⁷ General Staff, SS131 *Co-operation of Aircraft with Artillery*, Printing and Stationary Services, France, December 1917.

⁸ 3rd Squadron war diaries, January-March 1918, AWM4 8/6/13 Part 1 to 8/6/15 Part 2. By 1918 British artillery delineated between fire for destruction and fire for neutralisation. The former, usually conducted during trench warfare, aimed to destroy German guns, ammunition and battery positions. British gunners used neutralising fire, typically involving a large proportion of chemical shell, during offensive operations. Rather than methodically destroying enemy artillery and ammunition it had the more limited objective of incapacitating the gunners while the British infantry captured and consolidated their objectives.

periods of time, thus allowing for the enemy front to be divided into 'zones' onto which the corps squadron pilots could promptly and accurately call down fire.

During periods of position warfare photography represented a corps squadron's other major endeavour. Between January and March 1918, 3rd Squadron exposed 1 300 photographs.⁹ A minority of these were employed in cartography; the majority functioned as an important source of intelligence.¹⁰ Acting as a conduit between the squadron and the rest of the Australian Corps, a Branch Intelligence Section attached to 3rd Squadron administered requests for photographs from units extending down to the infantry battalion level to assist in the planning of operations.

The principal recipients of 3rd Squadron's photography, however, remained the CBSO and corps heavy artillery. In Flanders, during the winter of 1917-18, 3rd Squadron photographed the Australian Corps' counter-battery area two or three times each week to discover the location of camouflaged positions. Although the importance of photographs in locating enemy guns had diminished during 1917 with the introduction of sound-ranging and flash-spotting techniques, they continued to make a substantial contribution to the analysis of counter-battery intelligence. 'All these sources of information,' explained GHQ's flash spotting advisor, 'dovetailed into each other and one submitted all of them to the test of the air photograph' – a point corroborated in the general staff report on survey at the end of the war.¹¹

⁹ 3rd Squadron war diaries, January-March 1918, AWM4 8/6/13 Part 1 to 8/6/15 Part 2.

¹⁰ M. N. MacLeod, 'Mapping from Air Photographs', *The Geographical Journal*, volume 53, number 6, June 1919, 382-396.

¹¹ Lawrence Bragg et al, *Artillery survey in the First World War*, Field Survey Association, London, 1971, pp. 17-18; General Staff, 'Report on Survey on the Western Front 1914-1918', HMSO, 1920 pp. 38-39.

Air Power and the set piece battle

The well-established routines of tactical air support during trench warfare had, by 1918, come to translate well into set-piece battles when the infantry had clear objectives, when cooperation between the various arms was organised by timetable and when the enemy's dispositions, particularly his artillery, had been identified. In short, the tactical and operational predictability that supported air-ground cooperation during trench warfare played a similarly important role in most aspects of air support during set piece battles.

For the Australian Corps, the outstanding example of a set piece battle was the battle of Hamel on 4 July 1918. Although often characterised as innovative and claimed as a 'model' for future British offensives, the tactical aspects of the Hamel plan, including the employment of air power, mostly replicated many of the tactical and organisational aspects of earlier set piece battles on the Western Front.

As the Australian Corps' corps squadron, 3rd Squadron conducted the 'majority of the tactical work' during the battle. Its crews flew 80 hours of sorties on 4 July to provide the corps' heavy artillery with continuous observation of German lines and to watch known debussing areas for the deployment of counter-attack forces. Meanwhile, other elements of the squadron provided direct support to the infantry by visually following their progress with low altitude 'contact' patrols. Following the advance, 3rd Squadron then photographed the new front line to update the corps' maps.¹²

Assisting the Australian Corps were also several RAF units. No. 8 Squadron cooperated with the tanks while No. 9 Squadron dropped ammunition to troops on their objectives. The squadrons of 22nd (Army) Wing also directly supported the land battle: three of its four fighter squadrons flew ground-attack sorties while a unit of Bristol Fighters

¹² 3rd Squadron war diary, 4 July 1918, AWM4 8/6/19 Part 1.

watched roads, railways and debussing points as far back as Proyart (10 kilometres east of Hamel). The army wing's two bomber squadrons raided German bivouacs. GHQ also allocated three additional fighter squadrons from the BEF's strategic air reserve to fight for air superiority over the battlefield.¹³ Probably no other division-sized operation of the war enjoyed the combined support of aircraft 13 squadrons, or 230-odd aircraft. Besides the multi-faceted and highly integrated function air power had assumed by this stage of the war, the air plan for Hamel, devised in collaboration between Australian Corps and RAF staff, illustrates the British Army's growing reliance on machinery and firepower to reduce casualties and compensate for dwindling manpower.¹⁴

As the Hamel battle plan dispensed with a preliminary bombardment, 3rd Squadron's artillery spotting began at zero hour. For the first few hours airmen reported batteries neutralised by the barrage so that artillery commanders could switch their guns onto active targets. The plan also allocated five heavy batteries to answer zone calls, the airmen having been briefed on where the Germans might move their guns once the battle started.¹⁵ Third Squadron issued 80 zone calls and co-operated in the neutralisation of at least 17 batteries (though 'in many cases' airmen did not see the artillery's response to zone calls).¹⁶ Although not entirely preventing it, the Australian Corps counter-battery arrangements adequately suppressed the German artillery's response during the advance and consolidation.¹⁷

Counter-attack patrols flew beyond the German lines to a depth of 10 kilometres with instructions to transmit zone calls on concentrations of German troops and to engage them

¹³ Nerney, 'The Western Front Air Operations, May-November 1918', pp. 54-55, NAUK AIR1/677/21/13/1887.

¹⁴ Brigadier-General Thomas Blamey, BGS Australian Corps to GOC 4th Australian Division and GOC V Brigade RAF, 29 June 1918, NAUK AIR1/1592/204/83/17; Sheffield, *Forgotten Victory*, p. 236.

¹⁵ 'Counter-battery Australian Corps HA Operation Order No. 7', 1 July 1918, AWM26 364/12.

¹⁶ 3rd Squadron war diary, 4 July 1918, AWM4 8/6/19 Part 1; RAF Headquarters, 'Notes on corps squadrons work on the First and Third Army fronts during recent operations', 14 September 1918, NAUK AIR1/1009/204/5/1289.

¹⁷ 4th Division general staff war diary, 4 July 1918, AWM4 1/48/28 Part 1. The divisional staff noted that enemy artillery was 'not very active' and that retaliation against the Australian barrage was 'weak'.

with bombs and machine guns.¹⁸ Third Squadron's airmen dropped 138 bombs and fired 9,500 rounds on 4 July 1918.¹⁹ Combined with the 54,000 rounds and 850 bombs expended by 22nd Wing's fighter pilots, this had a considerable impact on such a narrow battlefield.²⁰ 'Several' German prisoners attested to the 'moral effect' of air attacks and noted how 'they prevent men getting machine guns into action almost as effectively as a barrage... it was almost impossible to look over the top without getting machine gunned from the air'.²¹ Corroborating this are German Second Army orders that noted 'heavy casualties caused by machine gun fire from low-flying enemy machines' at Hamel and issued instructions for dealing with British close air support.²²

Although Australian infantry had been signalling to aircraft since operations at Pozières in 1916, contact patrols represented a new role for 3rd Squadron at Hamel. Despite difficulties experienced during the 1916-17 campaigns, the general staff recognised that aircraft provided the shortest possible passage of information from the battlefield to corps headquarters.²³ Paper contact patrol reports, dropped by airmen returning from the line, reached headquarters staff in 24 minutes on average – up to half the time taken by a wireless message and a third of that usually taken by carrier pigeon.²⁴ Experience indicated that staff needed to carefully synchronise contact patrols with the infantry's timetable. At Hamel, 3rd Squadron had instructions to call for flares on the objective at 90 minutes after zero.²⁵ The infantry's clockwork progress and minimal resistance at the objective allowed them to respond 'well' when 3rd Squadron's pilots sounded their klaxon horns; the airmen delivered

¹⁸ Lieutenant Arthur Barrett to mother, 30 August 1918, AWM 2DRL/0053.

¹⁹ 3rd Squadron war diary, 4 July 1918, AWM4 8/6/19 Part 1.

²⁰ CO 22nd Wing RAF, 'Summary of Operations', 11 July 1918, NAUK AIR1/1592/204/83/17.

²¹ Summary of air intelligence, 18 July 1918, NAUK AIR1/2124/207/74/3; RAF Communiqué No. 15, 17 July 1918, AWM4 8/14/2.

²² Summary of air intelligence, 18 August 1918, NAUK AIR1/2124/207/74/3.

²³ General Staff, *SS 205 Notes on observation from aeroplanes*, Army Printing and Stationary Services, France, February 1918, p. 10; Captain Errol Knox, recording officer, 3rd Squadron to 3rd Squadron flight commanders, 3 July 1918, AWM4 8/6/18.

²⁴ Boff, 'Air/Land Integration in the 100 days', p. 82.

²⁵ Knox to 3rd Squadron flight commanders, 3 July 1918, AWM4 8/6/18.

‘exceedingly accurate’ reports.²⁶ It remained, however, to be seen how the system would cope during running battles and exploitation operations when it would be arguably more crucial for staff to keep track of their troops.

For the first time, at Hamel, the RAF organised battlefield resupply using equipment designed and built at 3rd Squadron under the direction of ‘B’ Flight’s commander, Captain Lawrence Wackett. The idea apparently came from German efforts to drop ammunition to troops on the battlefield during the spring offensives.²⁷ At Hamel a detachment from No. 9 Squadron carried out the work, dropping 111,600 rounds to Australian troops at their objectives and at dropping stations close behind the line.²⁸ Monash declared the scheme ‘an unqualified success’, noting how it permitted the rapid resupply of troops in ‘isolated and exposed positions’ and saved casualties among carrying parties.²⁹ His subordinates, though more prosaic, also indicated the trial’s success. The commanding officer of 4th Australian Infantry Brigade’s described it as working ‘satisfactorily’ while 6th Brigade’s commander noted how the scheme ‘worked very well’, delivering ammunition within 10 yards of one machine gun position.³⁰ Though faster, aircraft lacked the carrying capacity of other transportation available to the Australian Corps: a single tank could deliver four times as much ammunition as each of No. 9 Squadron’s aircraft, plus 300 grenades, 450 litres of water and a vast quantity of food and other trench stores.³¹ The RAF would, nevertheless, drop

²⁶ 3rd Squadron war diary, 4 July 1918, AWM4 8/6/19 Part 1.

²⁷ F. M. Cutlack, *Official History of Australia in the War of 1914-1918: Volume VIII: The Australian Flying Corps in the Western and Eastern Theatres of War, 1914-1918*, Angus and Robertson, Sydney, 1939, (1923), p. 272; GHQ AEF, Summary of Air Information, No. 29, 19.6.18, EML Gorrell papers, Series M, Item 14.

²⁸ 3rd Squadron war diary, 4 July 1918, AWM4 8/6/19 Part 1.

²⁹ Lieutenant-General John Monash, GOC Australian Corps to The Royal Commission on Awards to Inventors, 13 May 1919, AWM10 43/13.

³⁰ ‘Fourth Australian Infantry Brigade Intelligence Summary, 6am 3.7.1918 to 6am 4.7.1918’, AWM4 23/4/34 Part 1; Brigadier-General J. Paton, CO 6th Australian Infantry Brigade, ‘Preliminary Report on Operations of 6th AI Brigade on 4-7-1918’, AWM4 23/6/35 Part 1.

³¹ ‘Fourth Australian Division Report on Operations- August 7th to August 10th 1918’, AWM4 1/48/29 Part 3.

ammunition in all subsequent offensives, although this form of battlefield logistics would remain an ‘emergency’ adjunct to other forms of transportation.³²

Air Power and the exploitation Battle

Set piece operations such as Hamel, however, were the exception for the Australian Corps in 1918. In defensive actions during the German Spring Offensives in March and April, and in the offensive operations that followed the first day of the battle of Amiens on 8 August, the fighting done by Australian troops was characterised by mobility, a high operational tempo, exploitation rather than advances against set objectives and a decentralisation of the command and control of forces. In this operationally disruptive context air power would face tactical and organisational challenges while at the same time exploring roles that exploited aviation’s inherent flexibility and responsiveness to an extent not recognised during periods of position warfare.

The AFC’s 3rd Squadron first encountered this disruption to the predictable rhythms of trench warfare in April when it moved, along with most of the Australian Corps to join Fifth Army on the Somme. Significant German advances in this region meant that few of the structures that supported normal tactical air support existed. Third Squadron’s artillery spotters initially found themselves working on open warfare lines, relying exclusively on zone calls while the CBSO surveyed the enemy’s new counter-battery area to re-establish a program of destructive shoots. With little demand for photographs, ‘C’ Flight became the unit’s dedicated counter-attack flight, flying two or three sorties each day to watch for the concentration of German forces. Reflecting the expectation of further enemy offensives, all 3rd Squadron sorties carried bombs to drop on suitable targets, preference being enemy

³² H. A. Jones, *The War in the Air: Being the Story of the Part Played in the Great War by the Royal Air Force: Volume VI*, Clarendon Press, Oxford, 1937, p. 484; RAF Headquarters, ‘Notes on corps squadrons work on the First and Third Army fronts during recent operations’, 14 September 1918, NAUK AIR1/1009/204/5/1289; 15th Wing Operation Order No. 112, 17 September 1918, NAUK AIR1/1591/204/83/8.

batteries, which counter-attack patrols also reported by zone call.³³ The artillery and counter-attack patrol, previously two distinct roles, thus began to merge – a reflection of the greater flexibility, responsiveness and versatility that open warfare demanded.

The Australian Corps faced greater challenges with tactical air cooperation following the resumption of offensive operations in August – particularly in regards to cooperation between 3rd Squadron and the corps' artillery. On the first day of the Battle of Amiens (8 August 1918) artillery cooperation worked on trench warfare lines and proved highly effective despite bad weather disrupting aerial observation for a week before the battle. Indeed, the success of the artillery plan on 8 August owed much to sound ranging and flash spotting, and to the calibration of each of the Australian Corps' heavy guns at a range behind the lines, allowing the gunners to lay down accurate counter-battery fire at zero hour without any preliminary registration or aerial observation.³⁴

On subsequent days, however, as the carefully timed set-piece advance gave way to exploitation, the situation reversed. The infantry's advance left the sound ranging sections behind and put responsibility for locating the new German artillery positions 'almost entirely upon aeroplanes and balloons'.³⁵ On 9 August, for example, while the Australian Corps' sound rangers packed up and moved forward, 3rd Squadron located hostile guns harassing the Australian left and directed fire onto them, silencing nine batteries.³⁶ Anticipating the challenges of mobile warfare for artillery cooperation, the Australian Corps had decentralised control of its guns, detaching field guns from divisions to advance with infantry brigades and providing individual field batteries with wireless stations for direct

³³ Operation orders No. 11, 15th Wing RAF, 9 April 1918, AWM26 358/19.

³⁴ John Monash, *The Australian Victories in France*, Hutchinson & Co., London, 1920, p. 102.

³⁵ General Staff, 'Report on Survey on the Western Front 1914-1918', p. 122; 'Notes on Counter-battery Work in Battle of 8/8/18 and the advance from Villers Bretonneux to the Hindenburg Line', 1 October 1918, AWM26 494/8.

³⁶ 3rd Squadron war diary, 9 August 1918, AWM4 8/6/20 Part 1.

communication with 3rd Squadron's artillery patrols. In the event, this novel scheme provided less effective artillery co-operation at Amiens than in previous limited-objective offensives. Post-battle analysis cited the inexperience of the field artillery in using wireless and the airmen in observing the small burst of 18 and 60 pounder ammunition.³⁷ Third Squadron's CO nonetheless considered co-operation with the smaller calibre guns worth practising as the infantry had 'depended almost entirely on field artillery support' once they moved beyond the range of the heavy guns.³⁸

Following its 15 kilometre advance between 8 and 11 August, the Australian Corps paused, permitting eight days of conventional artillery preparation ahead of the battle of Chuignes, on 23 August 1918. This pattern – open warfare advances punctuated by brief pauses in front of organised defences – would continue until the Armistice. To maintain operational tempo the halts never allowed enough time for the type of elaborate preparation the stalemate had permitted – that is, time to deploy and survey the heavy artillery, photograph the enemy counter-battery area and establish a program of destructive shoots. Between 25 August, when the German retirement across the Somme commenced and 15 September, when preparation for the assault on the Hindenburg outpost line commenced, 3rd Squadron co-operated in no artillery cooperation arranged by the CBSO. This pattern would continue, with the squadron conducting 19 planned shoots in September and just one in October. In contrast, in June, a month of routine trench warfare, the squadron had conducted 119 shoots organised by the CBSO.³⁹ With the Australian Corps' sound rangers employed sparingly and only 'when the enemy appeared likely to make a stand for some days', responsibility for locating German guns and registering the Australian Corps' artillery

³⁷ 15th Wing RAF, 'Impressions of the Battle [of Amiens]', nd, NAUK AIR1/1592/204/83/17; Major D. V. J. Blake, CO 3rd Squadron to OC 15th Wing, 19 August 1918, AWM4 8/6/20 Part 1; Lieutenant-Colonel E. J. Cummins, CBSO Australian Corps, 'Counter-battery Methods during the Advance', October 1918, AWM26 494/8.

³⁸ Blake to OC 15th Wing, 19 August 1918, AWM4 8/6/20 Part 1.

³⁹ 3rd Squadron war diaries, June-October, AWM4 8/6/18 to 8/6/22 Part 2.

became primarily the responsibility of 3rd Squadron.⁴⁰ Its airmen employed a scheme improvised by the RAF dubbed 'Donnybrook Fair' whereby a pilot could conduct '8 to 10 rough registrations' without knowing the location of the batteries with which he co-operated.⁴¹ The standardised artillery co-operation that had achieved such effective results in trench warfare thus reverted to ad hoc methods to cope with the grand strategic timetable that Fourth Army became locked into.

The advance that carried the Australian Corps across the Somme at the end of August continued to illustrate the limitations that open warfare imposed on artillery co-operation. Despite another stretch of bad weather and a strong German fighter presence, 3rd Squadron provided a considerable amount of target intelligence during the assault on the Bouchavesnes-Mont St Quentin-Péronne line, locating around 150 targets (predominantly active enemy guns), reporting them via wireless and offering to range available guns.⁴² There were some successful instances that silenced German batteries but the majority of 3rd Squadron's zone calls apparently went un-answered.⁴³ The speed of the infantry advance left insufficient time to deploy heavy guns and work out a counter-battery program; consequently the Australian infantry captured these formidable positions with far less effective fire support than with which they had previously worked.⁴⁴ Further, it allowed the Germans to withdraw to the Hindenburg Line with little interference from British artillery. As Lieutenant Max Shelley noted following a counter-attack patrol on 29 August, 'Plenty of Hun transport are close to their line, but our guns are not yet in a position to answer our calls'.⁴⁵

⁴⁰ Cummins, 'Counter-battery methods during the advance', October 1918, AWM26 494/8.

⁴¹ Chamier, 'Donnybrook Fair', 20 September 1918, NAUK AIR1/1592/204/83/17.

⁴² 3rd Squadron war diaries August and September 1918, AWM4 8/6/20 Part 1 to 8/6/21 Part 2.

⁴³ 3rd Squadron war diary, 1 September 1918, AWM4 8/6/21 Part 1. It was normal that airmen would not always see the guns respond to the zone call but in this case the proportion of answers observed (around a quarter of the total) seems particularly low.

⁴⁴ Michele Bomford, *Beaten Down by Blood: the Battle of Mont St Quentin-Péronne 1918*, Big Sky Publishing, Newport, 2012, p. 180.

⁴⁵ Shelley, diary, 29 August 1918, AWM 2DRL/0290.

Despite the RAF's efforts to adapt its artillery cooperation procedures to address disruptions imposed by open warfare, the Australian Corps and its counterparts fought the semi-set piece battles that followed in September and October with artillery support that was less effective than it had been during trench warfare. Representative of this is the battle of the Selle, fought between 17-25 October, when 3rd Squadron was attached to II American Corps.

For five days before the infantry assault, II American Corps located 72 German battery positions; half of them by 3rd Squadron and the remainder by direct ground observation. Sound-rangers accounted for just one.⁴⁶ A thorough knowledge of German battery positions was particularly important since, if bad weather prevailed on Z-day (as it did), the artillery had instructions to engage these locations by firing at map co-ordinates.⁴⁷ Even had visibility been good, Fourth Army's artillery shortage, especially in heavy guns, limited the scope of air co-operation.⁴⁸ II American Corps could not spare any siege batteries for dedicated co-operation with 3rd Squadron after zero hour: the airmen would only identify targets and transmit rough corrections based on the mean point of impact.⁴⁹ (At Hamel, by comparison, 3rd Squadron had five siege batteries standing by to engage targets reported by the pilots).⁵⁰ As J. P. Harris notes, British artillery support proved 'not as effective as usual' on the Selle, though his explanation – 'low cloud and poor visibility' – fails to account for deficiencies imposed by the tempo of operations.⁵¹ Indeed, Fourth Army's gunners had fired a devastatingly successful artillery barrage at Amiens on 8 August despite a preceding week of weather conditions that made aerial observation virtually impossible.

⁴⁶ II American Corps RA summary of hostile battery locations 10 to 15 October 1918, 16 October 1918, AWM26 482/5

⁴⁷ 'Artillery co-operation instructions for 17 October 1918 operation by Lieutenant Colonel RGA II American Corps', 16 October 1918, AWM26 482/5.

⁴⁸ Monash, *Australian Victories in France*, p. 173; David Stevenson, *With Our Backs to the Wall: Victory and Defeat in 1918*, Allen Lane, London, 2011, pp. 239-240.

⁴⁹ SO for counter-battery, II American Corps to 5th Australian Division Artillery, 16 October 1918, AWM26 482/5.

⁵⁰ 'Counter-battery Australian Corps HA Operation Order No. 7', 1 July 1918, AWM26 364/12.

⁵¹ J. P. Harris and Nial Barr, *Amiens to the Armistice: the BEF in the Hundred Days Campaign 8 August – 11 November 1918*, Brassey's, London, 1998, p. 250.

Another impact that the mobility of operations during the Hundred Days had on air support was in increasing the reliance of headquarters staff on tactical air reconnaissance while, at the same time, underlining the limitations of this source of battlefield intelligence and communications. During the Australian Corps' advance to the Somme in the last week of August and its move up to the Hindenburg Line in the following fortnight, contact patrols provided accurate, timely reports on the location of forward Australian troops.⁵² Monash considered 'the Contact Aeroplane' unsurpassed in supplying division and brigade commanders with 'rapid and reliable information as to the progress of the various elements of our front line troops'.⁵³ During set-piece intervals, however, when accurate, timely information was perhaps even more crucial, contact patrols proved less reliable. At Mont St Quentin-Péronne 3rd Squadron's reports failed to clarify the situation sufficiently to allow close artillery support.⁵⁴ In her study of this action, Michele Bomford cites this as one reason why the 6th and 14th Australian Infantry Brigades advanced on 1 September with such inadequate fire support.⁵⁵ Contact patrols proved similarly ineffective during the battle for the Drocourt-Quéant Line occurring concurrently on First and Third Armies' fronts. The RAF noted the reluctance of troops to light flares for the airmen while closely engaged with the enemy and admitted that pilots showed 'a tendency' to 'show on the map more than had actually been seen'. Particularly problematic were airmen who saw isolated outposts and joined up 'the various pinpoints' to give staff the impression of a consolidated line where one did not exist.⁵⁶

Despite clear indications of these problems in early September, the Australian Corps continued to rely on tactical air reconnaissance during the Hindenburg and Beurevoir Line

⁵² 3rd Squadron war diary, 25-31 August 1918, AWM4 8/6/20 Part 1.

⁵³ Monash, *The Australian Victories in France*, p. 171.

⁵⁴ 3rd Squadron war diaries August and September 1918, AWM4 8/6/20 Part 1 to 8/6/21 Part 2.

⁵⁵ Bomford, *Beaten Down by Blood*, pp. 172-74.

⁵⁶ Brigadier General, I Brigade to HQ RAF, 12 September 1918, NAUK AIR1/1009/204/5/1289.

operations (29 September-5 October). Perhaps a successful trial on 24 September using white respirator bags to signal aircraft (instead of flares) renewed the Australian staff's confidence in the system.⁵⁷ So too may have the introduction of a procedure allowing contact patrols to wirelessly transmit their reports in addition to dropping paper copies at brigade and divisional report centres.⁵⁸ Nevertheless, 3rd Squadron's contact patrols failed the Australian Corps and the attached 27th and 30th American Divisions (of the II American Corps) during operations on the Hindenburg Line at the end of September.

Faced with appalling weather and the failure of American troops to light flares during the preliminary operations to secure a jumping-off line on 27-28 September, 3rd Squadron nevertheless managed to roughly identify a line.⁵⁹ In most places it appeared short of the objective, though some reports indicated isolated American parties further forward. This proved sufficient to convince GOC II American Corps to object to any shortening of the barrage for the main attack, which might fall on Americans in these advanced positions. As a result, 27th American Division had a thousand yards to advance before catching up to the supporting barrage on 29 September – a key factor in its failure that day and difficulties experienced by the 3rd Australian Division following in the second wave.⁶⁰ Air reports again led Monash, his staff and their American colleagues to misunderstand the situation on the battlefield on 29 September. Again struggling with poor visibility, by mid-morning contact patrols indicated that the Americans of the first wave had captured their objective.⁶¹ When the Australian units following in the second wave encountered determined German resistance between their start line and the supposedly secure first objective, corps staff interpreted this as isolated pockets that the inexperienced Americans had failed to mop up. Despite contrary

⁵⁷ Blake to 2nd Division general staff, 4 October 1918, AWM26 470/4.

⁵⁸ Wrigley, *The Battle Below*, p. 133.

⁵⁹ 3rd Squadron war diary, September 1918, AWM4 8/6/12 Parts 1-2.

⁶⁰ Blair, *The Battle of Bellicourt Tunnel*, pp. 32-35; Mitchell Yockelson, *Borrowed Soldiers: Americans Under British Command, 1918*, University of Oklahoma Press, Norman, 2008, pp. 166-67.

⁶¹ Australian Corps to Fourth Army, outward wires, 1100, 29 September 1918, AWM4 1/35/9 Part 8.

reports from his subordinates, Monash maintained this belief throughout the day, pressing his divisional commanders to attack in the afternoon without artillery support, again for fear of hitting Americans further forward.⁶² Operations also continued the following day with stripped-back artillery support, the American commander again prohibiting fire on areas that air patrols suggested his troops occupied.⁶³ Fourth Army captured the Hindenburg Line, largely due to IX Corps' successful crossing of the St Quentin canal on the morning of 29 September and with more infantry casualties and in a longer time frame than perhaps necessary.

The abysmal weather certainly reduced the reliability of contact patrols: reports from the airmen were sporadic and usually inconclusive. Yet it is important to note that their reports (of which only summaries survive) appear prosaic, reflecting the conclusion of Dale Blair's study of the battle that only a few small parties of Americans reached their objective on 29 September.⁶⁴ It appears Monash and his staff read too much into the snippets provided by the RAF while rejecting contrary intelligence from infantry commanders on the spot. The inexperience of American troops might also be blamed, yet mixed success by contact patrols with seasoned Australian troops during the previous month and subsequently 'poor' results with 2nd Australian Division on the Beaurevoir Line (3-5 October) suggest otherwise.⁶⁵

Indeed, tactical air reconnaissance had inherent problems which the general staff had acknowledged back in February 1918. Contact patrols 'rarely' proved successful when the enemy held onto a portion of the objective, forcing British troops to launch a 'small local attack' to secure it.⁶⁶ This, and the performance of contact reconnaissance during the

⁶² Prior and Wilson, *Command on the Western Front*, p. 371; 'Action near Bony', 3rd Division report, AWM4 1/46/23 Part 3

⁶³ Blair, *The Battle of Bellicourt Tunnel*, p. 116.

⁶⁴ Blair, *The Battle of Bellicourt Tunnel*, pp. 51-54.

⁶⁵ Blake to 2nd Division general staff, 4 October 1918, AWM26 470/4.

⁶⁶ General Staff, *SS205 Notes on Observation from Aeroplanes*, Army Printing and Stationary Services, France, February 1918, p. 10.

Hindenburg and Beaurevoir Line operations, raise doubts about the reliability of contact patrols in mobile warfare. If only liable to succeed when the infantry advance succeeded then contact patrols were not likely to be helpful when most needed, that is, when the infantry faltered and intervention from higher headquarters became most urgent. The contact aeroplane therefore represented a stop-gap measure with mixed results in the effort to maintain battlefield communications in an era when wireless was yet in its infancy. It did not solve the perennial problem of commanders maintaining contact with their troops during the Great War, though it reduced it in some instances. The point is underlined in Lieutenant-Colonel John Chamier's (CO 15th Wing) evaluation of his corps squadrons written shortly after the Armistice. Up to the war's end, contact patrols remained unreliable and frequently ineffective but, in the absence of an alternative, important in all forms of fighting (static, semi-open and open) and worth improving.⁶⁷

Following the capture of Montbrehain on 5 October, 3rd Squadron joined II American Corps, which replaced the Australian Corps in the line. It served as the Americans' corps squadron during the Second Battle of Cambrai (8 October) and the initial stages of the Selle river operation that commenced on 17 October.

Third Squadron's participation in these offensives illustrates a third feature of air power's employment in tactical cooperation during the Hundred Days – that is, the extent to which the work of corps squadrons became integrated into the land battle while at the same time exemplifying how high tempo, mobile operations forced the RAF to abandon previous procedures and improvise by combining previously distinct air power roles.

This indeed had begun to occur in 3rd Squadron following the battle of Amiens, in August, and gradually became characteristic of how the squadron operated. By October 3rd

⁶⁷ Chamier, '15th Wing Experiences', 25 November 1918, NAUK AIR1/1592/204/83/17.

Squadron's sorties had acquired a general nature encompassing any number of the squadron's previously discrete mission types. This had likewise occurred in corps squadrons throughout the RAF in order to achieve 'economy of force' and 'ensure continuous observation throughout the day'.⁶⁸ Though described in 3rd Squadron's war diary as a 'counter attack patrol', a typical sortie on 11 October identified the position of the line, issued five zone calls on active German batteries (and bombed one) and engaged a German two-seater aircraft in a dogfight.⁶⁹ In another example that underlines this flexibility and versatility, as well as demonstrating the responsiveness that 3rd Squadron's sorties achieved during the war's final weeks, Lieutenant William Palstra, while flying a contact patrol, noticed a mile-long column of German infantry deploy in extended order and advance. He wrote:

Dropped parachute flare to warn the diggers and bring down artillery barrage, also sent wireless SOS. In response to red Very light call two [Sopwith] Camels, one Bristol [Fighter] and another RE8 came along to attack this favourable target. [I] Swooped down on flank of advancing line with engine full out. Ham[ilton: my observer] fired 400 rounds one burst catching a party of six and killing 5. Counter attack stopped on the outskirts of Sequehart...

Despite having his Klaxon horn shot away by ground fire, Palstra and Hamilton completed their contact patrol, identifying friendly troops in the Beaurevoir line east of Joncourt.⁷⁰ Air power's capacity for such responsiveness owed much to the Central Information Bureau – a centralised wireless receiving station that collected RAF air reports and rapidly disseminated them to aviation and other units in the field. Established in mid-August, in recognition that the RAF needed to better-co-ordinate its ground attack sorties against the most favourable targets, the system really came into own during October,

⁶⁸ 'Notes on recent operations', c. October 1918, NAUK AIR1/725/97/8.

⁶⁹ 3rd Squadron war diary, 11 October 1918, AWM4 8/6/22 Part 1.

⁷⁰ Lieutenant William Palstra, manuscript notes/ diary, AWM 1DRL/0538.

allowing the humble RE8s to effectively become target-markers for the rest of the RAF.⁷¹ By the battle of the Selle the employment of Fourth Army's fighters had become 'largely dependent' on reports transmitted to the Bureau by the corps squadrons.⁷²

On 2 November 1918, Brigadier-General Lionel Charlton (OC V Brigade RAF) drafted an amended artillery cooperation manual to codify lessons learned in mobile operations in anticipation of continued fighting in 1919.⁷³ Charlton's amendments essentially sought to streamline the highly organised and centralised system that had worked so effectively during trench warfare but broke down after 8 August. They represent a microcosm of how operations during the Hundred Days broadened the scope but also limited the capability of air power on the battlefield. On the one hand, the high-tempo, fluid battles of autumn 1918 created opportunities for aviation's integration at lower-levels of the land battle and demonstrated a versatility and flexibility in air power that had been largely obscured by the structured routine of trench warfare. On the other, they reduced the effectiveness of air power missions that had been thoroughly worked out in the structured, predictable trench warfare battlespace of 1915-17. The RAF's challenge involved achieving flexibility to meet the rapidly changing tactical situation while retaining simplicity and uniformity of procedure – all within the boundaries of available technology. In 1918 3rd Squadron's airmen essentially used the same equipment as their predecessors had in mid-1916; Charlton and his staff could only do so much with one-way Morse code radios, cloth strips on the ground and the RE8's small carrying capacity. Changes to 3rd Squadron's work over the course of 1918 indicate that its personnel, along with their superiors at wing and brigade headquarters and counterparts in the Royal Artillery and Engineers, exploited the available technology to its

⁷¹ Nerney, 'The Western Front Air Operations May-November 1918', p. 161, NAUK AIR1/677/21/13/1887

⁷² '3rd Squadron Australian Flying Corps Battle Instructions', 22 October 1918, AWM4 8/6/22 Part 1.

⁷³ 'Proposed amendments in the new issue of SS131- Remarks by GOC 5th Brigade RAF', 2 November 1918, NAUK AIR1/1592/204/83/17.

full potential but failed to devise methods of co-operation as reliable or effective as they had during the stalemate.

In this respect the RAF's experiences during the Hundred Days reflect the broader experience of the armies that it served so unequivocally, even after the RAF's establishment as a separate service. The de-centralisation of command – specifically the devolution of planning, command and control to lower levels in the army – is well recognised in the literature as a trend common among the British Armies in France. Likewise, scholars acknowledge the shift towards mechanisation, with machinery replacing soldiers on the battlefield to increase mobility and firepower while preserving dwindling manpower. Less well-established in previous studies of the Hundred Days is the notion that mobility and concurrent operations represented disruptive forces that undermined ingrained practices and deteriorated the capability of certain arms – perhaps indeed, the entire expeditionary force. For the RAF at least, the battles of Hamel and Amiens marked a high point in the efficacy of army co-operation; thereafter, in many respects, it declined. That it nonetheless remained relevant and heavily relied upon during mobile operations was assisted by the lack of a viable alternative but ensured by the RAF's willingness to depart from previously established policy and the inherent flexibility and versatility of its organisational structure and indeed, the aeroplane itself.