

2nd TAF and the Normandy Campaign: Controversy and Under-developed Doctrine

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Dedication:

This work proposes conclusions about the British and Commonwealth air forces and armies engaged in the battle of Normandy. Such conclusions, it is often somewhat disapprovingly pointed out, can only be reached from the comfort of a peacetime study, and with the benefit of hindsight. That is absolutely true. However, it is precisely because we now have the luxury of such hindsight that we can return to questions first raised in the heat of battle, and now that the dust is finally settled hopefully begin to examine them with all of the evidence. It is in this spirit that this work has been done.

I dedicate this work to the eleven brave men of my old Squadron, No. 421, who made the supreme sacrifice that desperate Norman summer. They were some of the men who saved Western civilization.

Flight Lieutenant W.J. Drope, 7 June
Flying Officer R.J. Grigg, 7 June
Flying Officer R.W. Murray, 13 June
Flight Lieutenant F.J. Clark, 13 June
Flying Officer L.F. Curry, 15 June
Flight Sergeant R.G. Wallace, 23 June
Flying Officer R.G. Driver, 25 June
Flight Lieutenant C.D. Grant, 25 June
Flight Lieutenant P.G. Johnson, 18 July
Flying Officer F.W. Ward, 25 July
Flying Officer G.A. Cashion, 25 July

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INTRODUCTION

What did air power do to the German Army in Normandy? Traditionally the answer to this question has been that the Allies enjoyed crushing air supremacy, and that this doomed the Germans. Amongst historians, Chester Wilmot made this point early in his classic history of the war, *The Struggle for Europe*: “The value of this air supremacy can hardly be overrated.”¹

He is seconded in this opinion by virtually all of the Germans who fought in the campaign.

A much quoted 12 June message from Field-Marshal Rommel to Berlin reads:

Our own operations are rendered extraordinarily difficult and in part impossible to carry out [owing to] the exceptionally strong and, in some respects overwhelming, superiority of the enemy air force. The enemy has complete command of the air over the battle zone and up to about 100 kilometres behind the front and cuts off by day almost all traffic on roads or by-ways or in open country. Manoeuvre by our troops on the field of battle by daylight is thus almost entirely prevented, while the enemy can operate freely ... Neither our flak nor the Luftwaffe seem capable of putting a stop to this crippling and destructive operation of the enemy's aircraft.²

Rommel's opinion has been taken at face value. Indeed, it is commonly asserted that he foresaw all of this, and realized before the campaign began that he would be largely unable to manoeuvre large formations in the face of Allied air superiority.³ Such reliance on enemy testimony is, perhaps, understandable, but it has produced a singularly narrow interpretation of the battle of Normandy. With only passing references to the role of air power, historians of the campaign have concentrated upon analysing the ground operations. The major debate amongst historians of the Normandy campaign has been why it took the Allies so long to break out, and what this says about the relative quality of the German and Allied armies.⁴

Air historians, for their part, when considering World War II tend to focus upon either the undying controversy over the strategic bombing campaign, or the glory days of the Battle of

Britain. Although valuable work has been done, in particular by Richard Hallion⁵, David Spire⁶, W.A. Jacobs⁷, and Benjamin Cooling⁸, until Ian Gooderson published *Air Power at the Battlefield: Allied Close Air Support in Europe 1943-45*, little rigorous analysis of tactical air power's specific effects was ever written.⁹

This is unfortunate. As Max Hastings noted in his history of the Normandy campaign, it has become a "cliché" that air power defeated German intentions in Normandy. a cliché that needs careful examination.¹⁰ For despite the Allies' clear superiority in the air, no German formations sent to the Norman battlefield failed to arrive as formidable fighting organizations, and none collapsed for want of supply. None were unable to execute the manoeuvres ordered of them. And despite several massive efforts, air power never once broke open the German front. In fact, a more recent body of scholarly literature has grown up, dedicated to "de-bunking" some of the more over-blown claims for air power in Normandy.¹¹

So where does the truth lie? What was the effect of Allied air power on the Germans in Normandy? The definitive work on this question remains to be written. It would take a careful cross-referencing of the Allied records, which show what missions were mounted by the Allied air forces and what they were attempting to achieve, with the German records, which can be expected to show what actually happened to the units on the receiving end of those attacks, and what effects this had on German intentions, plans and operations.¹² David Fraser, for one, comes to the reasonable middle ground: "Rommel had been right in supposing that movement of German armour would be delayed and impeded by Allied air power, but wrong in assuming it could not take place at all."¹³

Various explanations have been offered to explain why air power's effect on the battle was perhaps more limited than previously appreciated. Most of these centre around the physical limitations of mid-1940s air weaponry and the weather, which was often miserable that desperate summer.¹⁴

The theme of this work is to examine a different and less tangible factor. It is to examine not *what* air power did to the Germans in Normandy, but *how* the Allies -- specifically the British and Commonwealth forces -- sought to apply their vast air power against the Germans in Normandy: in other words, to analyze the British doctrine and practice for tactical air power in Normandy.

In order to examine this issue, it is important to understand the pre-war and early-war background to the whole question of applying air power against an enemy army in the field, for this was a complex and difficult problem. After all, what is the most effective way to bring thousands of aircraft to bear against a powerful enemy army? The Royal Air Force (RAF) and the Army did not always agree.¹⁵ Indeed, different figures within the RAF often did not agree. There were long and bitter doctrinal disagreements and inter-service rivalries before complex organizations known as "tactical air forces" were eventually developed. These had intricate and highly refined procedures for planning and executing air strikes on enemy armies.

Despite the effort that the RAF did eventually dedicate to air support for the Army, there were often poor relations between the ground and air commanders throughout the campaign. Army officers were in many cases extremely unsatisfied with the RAF's application of air power against the Germans, and the echoes of those recriminations can still be heard in the historical literature today. Some Army criticisms were extremely blunt, nothing less than that the RAF was stinting

and unresponsive in its support of the land campaign.

Are those criticisms valid? What was the RAF trying to do with its air power in Normandy? What was in fact done with it? There is plenty of blame -- and credit -- to go around. In 1944 neither the RAF nor the Army had thought completely through their doctrine for applying air power against an enemy army in the field.

1. Chester Wilmot, *The Struggle for Europe* (London: Collins, 1954) p 289.
2. This message is quoted in Chester Wilmot, *The Struggle for Europe*, p 313, and widely repeated elsewhere, for instance in John Terraine's important history of the RAF in World War II *The Right of the Line* (London: Hodder and Stoughton, 1985) p 637.
3. This claim was advanced -- after the war -- by, amongst others, Friedrich Ruge (one of Rommel's staff officers in Normandy) *Rommel in Normandy* (London and San Rafael California: Presidio Press, 1979), and has been widely repeated elsewhere.
4. The literature in this debate is considerable. Max Hastings, for instance, argues that "The German army was the outstanding fighting force of the Second World War, and that it could be defeated by Allied soldiers only under the most overwhelmingly favourable conditions." *Ove:lord: D-Day and the Battle for Normandy* (London: Michael Joseph, 1984) p 12. These charges are repeated more generally by John Ellis in *Brute Force*, (London: Andre Deutsch Limited, 1990). John English's analysis of the Canadian Army's performance in Normandy is even more critical, *Failure in High Command: The Canadian Army and the Normandy Campaign* (Ottawa: Golden Dog Press, 1991). Recently, something of a counter-movement appears to have developed, arguing that Allied performance was no worse than the German. Examples include Stephen E. Ambrose, *Citizen Soldiers: The US Army from the Normandy Beaches to the Bulge to the Surrender of Germany, June 7, 1944 - May 7, 1945* (New York: Simon & Schuster, 1997), and John Balkoski *Beyond the Beachead: The 29th Infantry Division in Normandy* (Stackpole Books, 1999). For a succinct statement of this school of thought's views, see Terry Copp "From the Editor" in *Canadian Military History* Vol. 7 No. 4 Autumn 1998.
5. Richard Hallion, *Strike From the Sky: The History of Battlefield Air Attack 1911-1945* (Washington: Smithsonian Institution Press, 1989)
6. David Spires, *Air Power for Patton's Army: The XIX Tactical Air Command in the Second World War* (forthcoming).
7. W.A. Jacobs "Air Support for the British Army, 1939-1943" *Military Affairs* Vol. XLVI No. 4 December 1982, pp 197-182; "Tactical Air Doctrine and AAF Close Air Support in the

European Theater, 1944-1945" *Aerospace Historian* Vol. 27 No. 1 March 1980; "The Battle for France" Chapter 6 in *Case Studies in the Development of Close Air Support* edited by B.F. Cooling (Washington: Office of Air Force History, 1990).

8. Benjamin Franklin Cooling (editor) *Case Studies in the Development of Close Air Support* (Washington DC: Office of Air Force History, 1990).

9. Ian Gooderson, *Air Power at the Battlefield: Allied Close Air Support in Europe 1943-45* (London: Frank Cass, 1998).

10. Max Hastings, *Overlord: D-Day and the Battle for Normandy* (London: Michael Joseph Ltd, 1984), p 266.

11. For instance a chapter of Gooderson's *Air Power at the Battlefield: Allied Close Air Support in Europe 1943-45* is titled "Allied Fighter-Bombers Versus German Armoured Forces: Myths and Realities" pp 103-124. See also, "Anglo-Canadian Tactical Air Power in Normandy: A Reassessment" 1987 presentation at the American Military Institute, Virginia by Terry Copp and Robert Vogel.

12. Ian Gooderson has turned the first sod in this field with *Air Power at the Battlefield*, but he has based that work upon the wartime British Operational Research Section data, rather than German records. This is important, but not definitive.

13. David Fraser, *And We Shall Shock Them: The British Army in the Second World War*, (London: Hodder & Stoughton, 1983), p 328. The prominent American air power historian Richard Hallion has noted that consideration of tactical air power has been polarized between those arguing that it had little effect upon the land campaign and those arguing that it was decisive -- whereas in fact the truth lies somewhere in the middle. *Strike From the Sky*, p 2.

14. Christopher Evans, *Tactical Air Power in the Normandy Campaign: The Role of 83 Group* (Wilfred Laurier University: unpublished MA thesis, 1998) stresses the technical limitations of the time.

15. Throughout this work Royal Air Force will be abbreviated RAF, and this should be taken to include all of the Commonwealth Air Forces collectively. Army with a capital "A" is used to refer to the British Army as an institution.

CHAPER ONE: BACKGROUND

In 1943 RAF Second Tactical Air Force was formed to bring all of the British and Commonwealth tactical air power designated for the coming invasion of Europe under one command. But both the Army and the RAF brought much intellectual baggage to the debate over how to organize and apply air power in a land campaign. baggage that is critical to understanding how the tactical air forces were organized and applied against the Germans. Emotions on both sides ran extremely high over what may seem to most to be arcane and bloodless technicalities.

Early Animosity

Right from the RAF's birth in the immediate aftermath of World War I, there were inter-service rivalries between the RAF and the two older services. Partially, no doubt, this reflected the usual bureaucratic squabbling over a rapidly shrinking post-war budget. However, the rivalry between the RAF and the two older services was far more pronounced and bitter than anything that had ever been seen before between the Army and Royal Navy. A major factor at the root of this was the fervent belief of the RAF's founders that they had found a "better way" to win wars, and that, indeed, they had rendered the two older services obsolescent, if not obsolete. Wars would be won in the future, the apostles of air power's new vision argued, not by massed armies or fleets, but by massed bombers, striking directly at the heart of any enemy's homeland.

Nowadays, intellectual credit for this argument is usually accorded to the Italian soldier/pilot and fervent air power propagandist, Guilo Douhet. Certainly, he wrote an early and ardent expression of this idea, *The Command of the Air*, first published in 1921 under the auspices of the Italian Ministry of War.¹ Douhet's thought began with the idea that the Great War had shown that modern armies stalemated into costly attritional warfare.² Like so many military theorists of the time, Douhet was determined to find a better way. His experience as a military pilot, and the history of the German raids on London, convinced him that he had found one -- air power. In Douhet's vision, however, air power was not to be applied on the battlefield to break the costly stalemate of trench warfare. Rather, Douhet argued that the true use for air power was direct attack on the enemy homeland, in particular the enemy capital.³ This, Douhet believed, would result in damage no nation could sustain, leaving it no choice but to sue for peace. In Douhet's vision, the only roles left for armies would be defensive actions along the nation's frontiers while the air forces fought the decisive battle, and perhaps occupation of the enemy homeland after they had surrendered.

Almost certainly, the RAF did not in fact derive its doctrine from Douhet, but rather independently developed what were essentially the same ideas.⁴ Regardless, the doctrine espoused by the RAF almost from the first was essentially the same, beginning with the man usually considered the "Father of the RAF" Lord Trenchard.⁵ Trenchard had commanded the "Independent Bombing Force" in France during its brief existence at the end of the Great War, and was appointed the Chief of Staff for the newly independent RAF in 1919. It has been widely noted by historians that strategic bombing, as an instrument of state policy independent of the other two services, was the *raison d'etre* for the RAF at its birth.⁶ It is probably reasonable to presume that Trenchard, and

the other converts, both truly believed that strategic bombing was a better way to win wars, and fully realized that this was the only justification for their stature as an independent service. In any event, almost immediately Trenchard had to defend the fledgling RAF from vehement attacks against its very existence by the Army and Royal Navy.⁷

Sir Arthur Harris, one of the participants at the time and later a famous exponent of bombing, gives some insight into the depth of the feelings with his own words.

This was the moment [1922] when the army and navy struck. By intrigue resulting in the formation of the Fleet Air Arm, which afterwards became an integral part of the Navy, the Air Force was split in two. The army's plans were, however, far more destructive, for the War Office proposed that the Air Ministry should have control of nothing but civil aviation, research, experiment and supply, which meant that in fact the Air Force should cease to exist. But in this the soldiers, who are vastly inferior to the sailors in the arts of propaganda and politics, badly over-reached themselves, and the proposal was successfully resisted.

Thereafter, for nearly twenty years, I watched the army and navy, both singly and in concert, engineer one deliberate attempt after another to destroy the Royal Air Force. Time after time they were within a hairbreath of success, time after time Trenchard, and Trenchard alone, saved us. If they had succeeded they would have abolished our air power as they succeeded in abolishing our tank power, while retaining the Camberly drag hunt, and, as the pinnacle of our sea power, those scarcely more useful battleships, whose bones now lie where air power so easily consigned them, littering the floors of the ocean or obstructing the harbours of the world.⁸

The RAF's first operations as an independent service were an expression of the independent bombing idea, if not quite what Douhet had in mind. Beginning in 1920 the RAF began what was called "air control" of certain recalcitrant portions of the Empire. This amounted to using RAF squadrons to bomb local natives into submission whenever they threatened the imperial order, a strategy used in Somaliland, Afghanistan, and most notably Iraq. This was found to be cheaper than maintaining large garrisons of Army troops for putting down rebellions and came to be known as "substitution", the policy of substituting smaller and less costly RAF contingents for larger and

more expensive Army garrisons.⁹ Such a policy can hardly have endeared the RAF to the Army.

Little Army - RAF Cooperation, Or Even Interaction

Until the mid 1930s, the RAF gave scant attention to air support of armies in the field. Trenchard, while Chief of the Air Staff, had tended to deprecate any tactical or supporting role for air power.¹⁰ However, it must be said that the neglect of army cooperation was only partly due to the bad blood between the two services. From the end of the Great War until the mid 1930s it was never envisioned that Great Britain would again be fielding a large army for campaigning on the continent. So long as no continental land commitment was contemplated, the Army's role was limited to garrisoning the outer reaches of the Empire and last ditch self defence of the British Isles.¹¹ In such circumstances there was no great requirement for RAF air support to large armies, even if such a thing were thought to be worthwhile.¹²

Not that the RAF did think it worthwhile in any case. One of the few to give the issue any attention at all was John Slessor, an RAF career officer who published a book on the subject in 1936.¹³ Based upon an admirable historical analysis of air support in the Great War, Slessor argued that: "... *the aeroplane is not a battle-field weapon* -- the air striking force is not as a rule best employed in the actual zone in which the armies are in contact.¹⁴

Slessor was of the opinion that it would be more profitable to use air power -- or least whatever air power might have to be diverted from the strategic bombing campaign -- against the enemy's rear, particularly against his lines of communication at corps or higher level.¹⁵ But Slessor's real feelings appear to have been that almost any dedication of air power to armies in the field was a waste.

The ultimate reduction of the enemy nation may (and very likely will) be undertaken, not by the traditional methods of land invasion, or by continued assaults upon their armies in the field, but by air measures. That is to say it will become an air campaign, and the task of the army will be simply to protect the air bases.¹⁶

Slessor's book was based upon lectures he had given at the Army Staff College at Camberly as a Wing Commander in the early 1930s. One can just imagine the officers' reaction there to being told that their primary task would be "simply to protect the air bases." Still, Slessor was at least taking the time to address Army officers; throughout this period there was little interaction of any kind between the two services.

Rearmament and Air Power

This atmosphere of mutual disregard between the Army and the RAF began to come to a head in 1935, when the British government finally began to seriously consider the new German menace. One of the first results of this was the so-called "Western Plan", which for the first time since the Great War envisioned a continental commitment for the British Army. With this in prospect, the War Office formally requested that seven bomber and five fighter squadrons of the RAF be allocated to the first contingent of any British field force sent to the continent, with a further six bomber and four fighter squadrons for each of the potential three subsequent contingents.¹⁷ The Air Ministry steadfastly opposed these requests, arguing against tying the RAF's limited resources down to any pre-arranged commitments.¹⁸ Eventually it was agreed that two bomber squadrons would be earmarked for the first contingent, along with the five requested fighter

squadrons, but that any further allocations to following contingents would be determined only at the time.¹⁹

The RAF and Air Ministry also steadfastly opposed any shift of official British air policy away from a deterrent strategy based upon bombers towards a defensive strategy based upon fighters and the new "Radio Direction Finding" technology. This debate was so fierce that the government eventually appointed an impartial outsider, Sir Thomas Inskip, Minister for Co-ordination of Defence, to review the matter. In late 1937 he proposed, in essence, to do exactly what the Air Ministry had been so fiercely resisting -- rely upon Fighter Command to defend Britain against enemy bombers.²⁰ Lord Swinton, the Air Minister, argued that "Counter-attack [against the enemy homeland by bombers] remains the chief deterrent and defence."²¹ The Air Staff's official response to Inskip's proposal was even more scathing, accusing Inskip of suffering from "strategic misconceptions" and reiterating that "*The bomber force is fundamentally the basis of all air strategy.*"²²

Things had scarcely improved when war did eventually come in 1939. In March of that year the Chief of the Imperial General Staff, Lord Gort, with an eye to the envisioned 32 division programme, formally demanded that a strong striking force of bombers be included under the field force.²³ Convinced of the strategic importance of independent bombing, the Air Ministry resisted Gort's requests for bombers particularly fiercely. Slessor, by now an Air Vice Marshal and senior planning officer on the Air Staff, wrote that the War Office seemed bent on "a regrettable revival of the old idea which there had been some reason to think was dead, that when the soldiers talk about co-operation they really mean the subordination of the air force to the army."²⁴ At one inter-service

Whitehall meeting in June the Assistant Chief of the Air Staff asserted that fundamentally, all bombing was the same, regardless of the actual target; therefore no specialization in training or command arrangements were necessary to meet the field force's needs.²⁵

When the decision was finally taken later that year to dispatch a British Expeditionary Force (BEF) to the continent the RAF realized that it would have to provide something to forestall Army demands for a separate air force under Army control, but the issue never was settled to either parties' satisfaction.²⁶ During the Battle of France the BEF had the two bomber and four fighter squadrons the RAF had agreed to provide, plus six Army Co-operation squadrons and two flights of VIP transport aircraft.²⁷ The "Advanced Air Striking Force" or AASF went to France as well, but it remained under Bomber Command's authority.²⁸

After Dunkirk, the RAF quickly reverted to its pre-1935 philosophy when there had been little contemplation of a British continental land commitment. According to its own thinking, the RAF now had three major missions: protection of the home island from air attack (Fighter Command's job); the mounting of a strategic bombing campaign against Germany (Bomber Command's job); and support to the Royal Navy for the Battle of the Atlantic (Coastal Command's job).²⁹ If all went well, in the RAF's view the Army's role would be restricted to home defence of the British Isles should an invasion come, and subsequent occupation of a Germany that had been defeated by the strategic bombing campaign.³⁰ Nevertheless, the Army could not be ignored entirely, and shortly after Dunkirk "Army Cooperation Command" was formed within the RAF under Air Marshal Sir Arthur Barratt. This Command, however, came last in the RAF's priorities, and often languished with "more staff officers than aircraft."³¹

For its part, the Army remained mesmerized by the German performance in France and, bitter about the lack of any visible RAF presence over the beaches of Dunkirk, was obsessed with getting dive-bombers that could be "whistled-up" (as one commentator put it) the way the Germans seemed to do.³² The RAF opposed any such suggestion at every turn. Slessor even went so far as to write a paper specifically devoted to de-bunking the dive-bomber mania in the Army, pointing out that the Germans did not, in fact, devolve control of dive-bombers to lower army formations, and were only able to use the obsolescent Junkers 87 divebombers where they enjoyed air superiority and their opponents lacked effective anti-aircraft artillery.³³ Slessor stuck to his original theories from *Air Power and Armies*, concluding "I do not believe in close support at all."³⁴ In general, the RAF maintained that the war winning instrument would be strategic bombing; any allocation of scarce RAF resources to army support would inevitably compromise that decisive effort, violating the principle of concentration of force. In 1941 the Chief of the Air Staff himself, Sir Charles Portal, officially argued to the Cabinet that:

The Army has no primary offensive role... We aim to win the war in the air, not on land. Undoubtedly we must build up land forces as well with the priorities already assigned, but as far as the continent is concerned these forces will be used as an Army of Occupation after the bombing offensive has crushed the enemy's will to resist. It is essential not to allow the clarity of the existing directive to become blurred. Our hopes of winning the war depend on the strength of the Bomber Force in the spring of 1943... I submit that major diversions [of resources away from bomber forces to army support] should only be permitted as the result of a major change of policy.³⁵

The new Chief of the Imperial General Staff, Sir Alan Brooke, immediately strove to bring about just such a "major change of policy." Brooke had been a corps commander at Dunkirk, and personally felt strongly about what he considered to have been the RAF's inadequate support in that critical defeat.³⁶ In March of 1942 he demanded the establishment of a force of 109 squadrons to be trained in support operations by the Army and operated under Army control as an integral

component.³⁷ Portal and Brooke reached a minimal compromise at a Chiefs of Staff meeting on 19 May 1942, striking an agreement to augment Army Cooperation Command and No. 2 Group slightly, and to train 15 squadrons within Fighter Command in ground support, but they could not agree on the crucial issue of command and control.³⁸

Meanwhile, work to improve inter-service cooperation and air support to ground forces had been proceeding at the lower levels, at least on technical matters. In the still neglected Army Cooperation Command of the RAF, in the far backwater of Northern Ireland, a small group of officers had been brought together under the leadership of Group Captain Wann and Brigadier Woodall. Veterans of the recent debacle in France, both were determined to do better.³⁹ They produced what came to be called the "Wann/Woodall" report, which outlined a system of control for air support that formed the basis of the eventual Tactical Air Force doctrine. The essentials of the Wann/Woodall system was the establishment of a joint Army/RAF headquarters⁴⁰ which would control a composite group of aircraft, and the creation of a radio network outside of the normal Army chain-of-command specifically for the purpose of controlling air support.

It was just at this time that a major technological development occurred, essentially by coincidence. Languishing somewhat since its glory days in the Battle of Britain, Fighter Command was casting about for an offensive role. Apparently on his own initiative, the commander of No. 11 Group, Air Marshal Trafford Leigh-Mallory, began experiments in the modification of fighters to carry bombs and attack ground targets.⁴¹ Thus the "fighter-bomber" was born, ironically by a process completely unrelated to the Army's long and persistent demands for effective air support. Brooke resisted any proposal to develop a ground attack role within Fighter Command, arguing for the establishment of such a force within Army Cooperation Command.⁴²

The first implementation of these new ideas -- the Wann/Woodall system and the fighter-bomber concept -- came in the Western Desert, far from the doctrinal squabbling at Whitehall, and achieved considerable success. In Britain, however, acrimony between the RAF and Army remained fierce, and by October 1942 the debate had escalated to the level of Churchill himself for resolution. On 7 October 1942 he produced a compromise ruling slightly favourable to the RAF.

Above all, the idea of keeping standing patrols [of aircraft] over [Army] columns should be abandoned. It is unsound to distribute aircraft in this way... The Army Commander-in-Chief will specify to the Air Officer Commanding-in-Chief the targets and tasks which he requires to be performed, both in the preparatory attack on the rearward installments of the enemy and for air action during the progress of the battle. It will be for the Air Officer Commanding-in-Chief to use his maximum force for those objects in the manner most effective.⁴³

Churchill's ruling settled the debate, and Brooke reluctantly conceded to the dissolution of Army Cooperation Command and the establishment of a new "Tactical Air Force" within Fighter Command of the RAF, rather than under the Army.⁴⁴

It is perhaps difficult to appreciate today just how bitter the rivalry between the Army and the RAF really was. In 1941, in the midst of the air support debate, Slessor wrote of the Army that:

... the rising generation of soldiers (with about 2 exceptions) are quite unfit to command air forces, by training and tradition -- they are only just adjusting their mentality from 4 to 30 miles per hour, and it will take them another generation to adjust it to 400, by which time what is left of the field army will be a component of the RAF.⁴⁵

This was the environment in which attention to air support was fought out.

Conclusion

Thus, 2nd TAF was born of a long, fundamental, and deeply felt disagreement between the Army and the RAF. It was this feud which lay behind the evolution of the complex system of "dual command" developed for tactical air forces. It is important, however, to appreciate that this dispute was not merely a turf war between jealous commanders. Both sides had reasonable arguments and honestly, if not fervently, believed in the validity of their positions. The Army wanted to ensure that soldiers received timely and effective air support, something they had often lacked in the war's early campaigns. The RAF, on the other hand, strongly and sincerely believed that what the Army wanted was a fundamentally mistaken application of air power, and held out for a system that would not decentralize, or "penny packet" away, its potential.⁴⁶

Nevertheless, despite this unpromising and often outright antagonistic environment, a detailed and complex system for organizing and controlling air power in support of armies was eventually developed, a solution that represented a compromise between the RAF and the Army. Contrary to the Air Marshals' initial wishes, a considerable portion of the RAF's resources was in fact to be consigned to the new tactical air forces, specifically to support the Army. But contrary to the Generals' initial wishes, this air power was to remain centralized under the RAF, and not placed under the command of the Army.

1.. Giulio Douhet, *The Command of the Air*, translated by Dino Ferrari, (New York: Coward-McCann, 1942).

2.. Although it very quickly became the received wisdom, this view of the Great War more or less completely ignores the quite fluid manoeuvre on the Eastern and Middle Eastern fronts. Neither does it necessarily reflect the entire experience of the Western front; the western campaigns

of 1918 (the German Michael offensive and the Allied drives of the final Hundred Days) involved advances and retreats of hundreds of miles.

3.. Douhet, *The Command of the Air*, in particular Chapter 1 of Book I, pp 3-33, and Chapter IV of Book II, pp 187-207.

4.. This issue was perhaps first broached by Robin Higham, *The Military Intellectuals in Britain: 1918-1939* (New Brunswick NJ: Rutgers University Press, 1966) pp 257-259. See also Barry Powers, *Strategy Without Slide-Rule* (London: Croom Helm, 1976) pp 177-178. More recently Scot Robertson convincingly traced the development of RAF bombing doctrine with barely a mention of Douhet in *The Development of RAF Strategic Bombing Doctrine, 1919-1939* (Westport CT: Praeger, 1995), in particular Part I, pp 1-55 and Chapter 7 pp 91-110.

5.. See, for instance, H.R. Allen's paean to him in *The Legacy of Lord Trenchard* (London: Cassell, 1972) p 1.

6.. Brian Bond, *British Military Policy Between the Two World Wars* (Oxford: Oxford University Press, 1980) p 22; Max Hastings, *Bomber Command* (London: Michael Joseph, 1979) p 40; Higham, *The Military Intellectuals in Britain: 1918-1939*, pp 175, 196; R.J. Overy, *The Air War, 1939-1945* (New York: Stein and Day, 1981) pp 12-13; Malcom Smith *British Air Strategy Between the Wars* (Oxford, 1984) pp 50, 55-56, 74, 304.

7.. H. Montgomery Hyde, *British Air Policy Between the Wars 1918-1939* (London: Heinemann, 1976), p 490. See also Powers, *Strategy Without Slide-Rule*, p 158.

8.. Sir Arthur Harris, *Bomber Offensive* (London: Collins, 1947) p 277.

9.. For instance, in the first year of "air control" in Iraq, British expenses fell from , 20.1 million to , 6.6 million. Powers *Strategy Without Slide-Rule*, p 173.

10.. Ibid p 167.

11.. See, for instance, Smith *British Air Strategy* pp 85-90 for an examination of Britain's strategic dilemmas of that time and how this affected air policy.

12.. H.N. Gibbs *Grand Strategy Volume I* (London: HMSO, 1976) pp 441-604; Bond, *British Military Policy between the Two World Wars*, pp 214-380.

13.. John Slessor (then a Wing Commander), *Air Power and Armies* (London: Oxford University Press, 1936).

14.. Ibid, p 90. Emphasis in original.

- 15.. Ibid pp 90-92.
- 16.. Ibid, p 3.
- 17.. Ibid, p 323.
- 18.. Ibid.
- 19.. Ibid. The five fighter squadron commitment was later changed to four squadrons, but with the same number of aircraft.
- 20.. Hyde, *British Air Policy Between the Wars 1918-1919*, pp 408-410.
- 21.. Ibid.
- 22.. Air Staff note to cabinet, PRO AIR 8/226, quoted in Sir Charles Webster and Noble Frankland *The Strategic Air Offensive Against Germany 1939-1945* Vol. IV (London: HMSO, 1961) pp 96-98. Emphasis in original.
- 23.. Ibid p 324.
- 24.. Note by D Plans, "Services Required from the RAF for the Field Force" May 1939, PRO AIR 8/272, quoted in Smith *British Air Strategy Between the Wars*, p 91.
- 25.. Ibid, pp 322-3.
- 26.. William A. Jacobs "Air Support for the British Army, 1939-1943" *Military Affairs* Vol. XLVI No. 4, December 1982, pp 197-182, p 175.
- 27.. Ibid p 326. It should be noted that equipped as they were with Lysander aircraft, the Army Co-operation squadrons were not expected to do anything beyond reconnaissance and liaison.
- 28.. Ibid p 326.
- 29.. PRO CAB 80/58, The Air Program, 21 May 40, cited in David Syrett, "The Tunisian Campaign, 1942-43" pp 153-189 in *Case Studies in the Development of Close Air Support* ed by B.F. Cooling (Washington: Office of Air Force History, 1990) p 158.
- 30.. Ibid.

- 31.. Charles Carrington, *Soldier at Bomber Command* (London: Leo Cooper, 1987) or John Terraine *The Right of the Line: The Royal Air Force in the European War, 1939-1945* (London: Hodder & Stoughton, 1985) pp 350-351.
- 32.. Charles Carrington, "Army/Air Co-operation, 1939-1943" *RUSI Journal*, December 1970, pp 37-41, p 38.
- 33.. Ibid.
- 34.. Air Vice Marshal Slessor, memorandum "Use of Bombers in Close Support of the Army" 6 May 1941, PRO AIR 20/2970 quoted in Peter C. Smith *Close Air Support: An Illustrated History 1914 to the Present* (New York: Orion Books, 1990), p 64. When Slessor wrote this in 1941 he was once again a senior planner on the Air Staff, and perhaps the RAF's most influential thinker.
- 35.. COS(41)83(0) "The Air Programme" 21 May 1941, PRO CAB 80/58, quoted in Jacobs "Air Support for the British Army, 1939-1943" p 175.
- 36.. Jacobs "Air Support for the British Army, 1939-1943" p 178.
- 37.. Ibid, p 176.
- 38.. Minutes COS(42) 155th (19 May 1942), cited *ibid*.
- 39.. An official account of this is given in the originally classified report Air History Branch, *Air Support, The Second World War 1939-1945: Royal Air Force* (Air Ministry: Air Publication 3235, 1955), but the best account is Charles Carrington's memoir *Soldier at Bomber Command*. See also Shelford Bidwell and Dominick Graham *Fire-Power: British Army Weapons and Theories of War 1904-1945* (London: Allen and Unwin, 1982) pp 264-265, and Richard Townsend Bickers *Air War Normandy* (London: Leo Cooper, 1994) pp 150-167.
- 40.. Initially this joint headquarters was envisioned at the corps level. Eventually, it came to reside at the Army level.
- 41.. Jacobs "Air Support for British Army, 1939-1943" p 177.
- 42.. Ibid, p 180. See also John Slessor, *The Central Blue* (London: Cassell, 1956) pp 419-422.
- 43.. DO(41)17(7 Oct 1942) PRO CAB 69/4, cited *ibid* p 180; also cited in Winston S. Churchill, *The History of the Second World War Vol III The Grand Alliance*, (London: Cassell, 1950) p 443.
- 44.. Jacobs "Air Support for the British Army, 1939-1943" is the best published discussion of this heated but largely overlooked debate. See in particular pp 178-181.

45.. Letter AOC 5 Gp [Slessor] to D Plans (15 June 1941), PRO AIR 20/2809, cited *ibid* p 175.

46.. Air Marshal Coningham himself, 2nd TAF's wartime commander, used the expression "penny packet" in a postwar address to the Royal United Services Institute. "The Development of Tactical Air Forces" *RUSI Journal* Vol. XCI No. 562, May 1946, pp 211-226.

CHAPTER TWO: THE SYSTEM

The first fruit of Churchill's October 1942 ruling came in North Africa, with the RAF elements operating there becoming known as the Desert Air Force or "DAF", which is generally considered the first practical expression of the tactical air force idea.¹ Meanwhile, back in Britain planning was underway for Operation OVERLORD, the planned invasion of the continent. This had originally begun under the Army's General Morgan, but by late 1942 it was clear that any foray back to the continent would rest heavily upon air power, and so it was decided to bring an appropriately senior RAF officer into the planning process. Reflecting the new emphasis on tactical air forces in support of army operations, the commander of Fighter Command -- Air Chief Marshal Trafford Leigh-Mallory -- was chosen for this role.² On 10 March 1943, it was further decided that the RAF "Composite Group" assigned to OVERLORD should be expanded to a "Tactical Air Force." This came to be designated "Second" Tactical Air Force, the DAF constituting the first Tactical Air Force. Thus, on 1 June 1943, 2nd TAF formally came into being, and in accordance with the Churchill compromise of October 1942 it was established within Fighter Command, rather than within the Army, or even Army Co-operation Command.³ In fact, with the establishment of 2nd TAF, Army Co-operation Command ceased to exist, its resources being folded into the new organization.⁴

Original 2nd TAF:

- No 2 Group (from Bomber Command)
- No 83 Group (from Fighter Command)
- No 84 Group (to be formed)
- 38 Wing (from Army Cooperation Command)
- 145 Photo/Reconnaissance Squadron

Between June 1943 and June 1944 2nd TAF grew, eventually becoming a huge organization. With some 2000 aircraft, by D-Day it numbered almost a hundred squadrons divided between four Groups and one strategic reconnaissance wing, plus considerable control and support elements (see Figure 1).

Order of Battle

No. 85 (Base) Group was equipped predominantly with Mosquitos, and consisted of 17 night fighter squadrons. Its intended primary role was guarding 21st Army Group against night bomber attack by the Luftwaffe, the function Mosquito squadrons had perfected so well in previous years in the defence of the British Isles. In the event, the Germans mounted so little an air threat against the invading Allied armies that 85 Group was used primarily as a light bomber force, supplementing No. 2 (Bomber) Group, the element within 2nd TAF dedicated specifically for the light bombing role. This force of 12 squadrons was equipped with Bostons, Mitchells and Mosquitos, and was intended for attacking targets in the Germans' rear, primarily their lines of communication. But the heart of the organization and the parts primarily dedicated to close support of the field armies were the two Composite Groups. These were the formations of fighter-bombers specifically organized for responding rapidly to the Army's calls for air support.

Second Tactical Air Force (D-Day through the Normandy Battles)

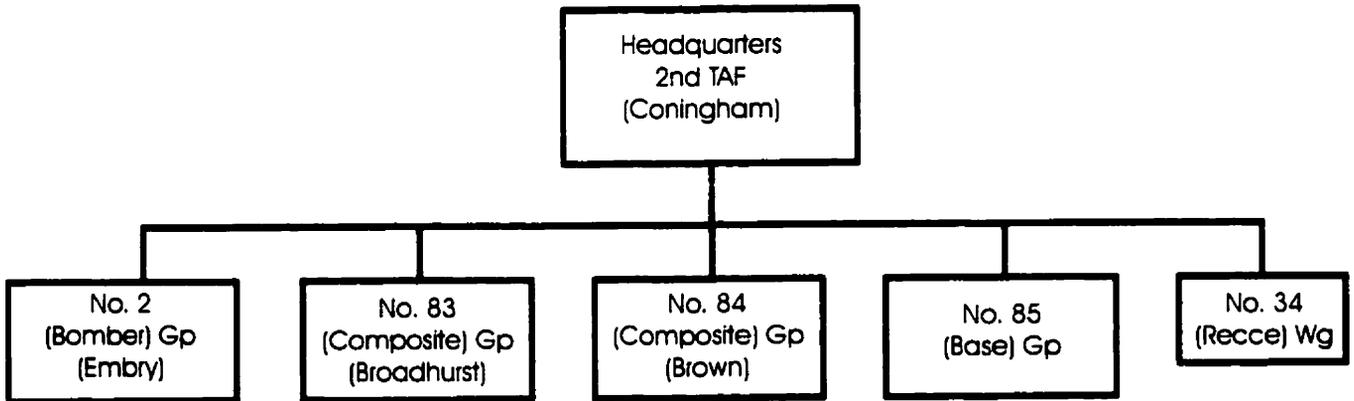


Figure 1: Second Tactical Air Force Summary Order of Battle.
See the appendices for detailed group orders of battle.

Command

Given the contentious background to the development of tactical air forces, and the disputes over who should control air power, it is scarcely surprising that the command arrangements for the air forces devoted to OVERLORD in general, and 2nd TAF in particular, were hotly contested.

The doctrinal and bureaucratic wars over control of air resources had resulted in the general principle known as the system of "joint command". The Army and RAF remained separate services, and they operated under separate commanders, even in the furtherance of one

combined plan. As contemporary doctrine put it:

The Army Commander tells the Air Force Commander what he wants to achieve, and the Air Staff, having examined the problem, make Air plans with the Army's aim constantly in view.⁵

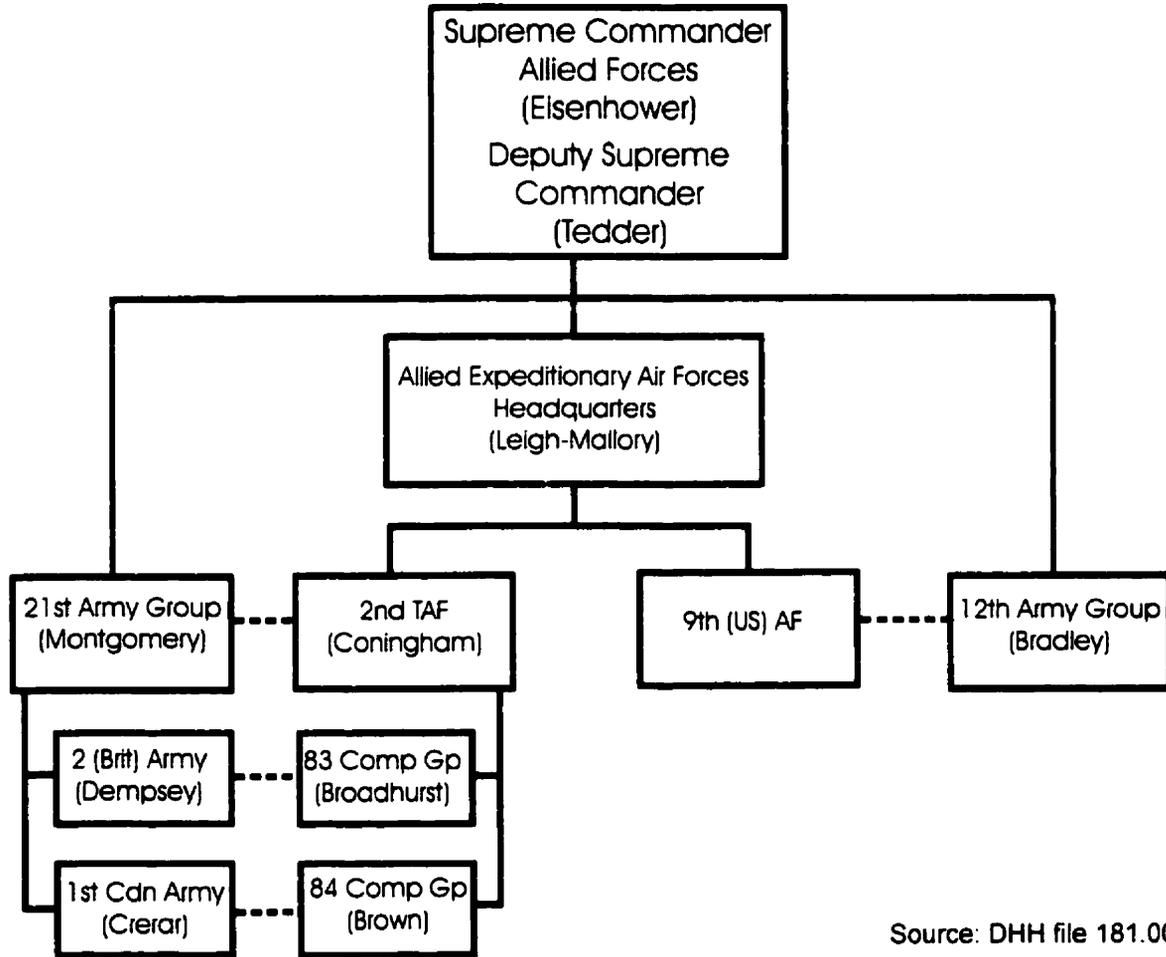
Under this system, headquarters were paired at each level of command (see Figure 2).

For OVERLORD, 2nd TAF itself was in support of Montgomery's 21st Army Group, and both of these formations had a headquarters which were deemed to be co-equal. It was intended that headquarters 2nd TAF would be co-located with headquarters 21 Army Group, although in practice it did not always work out that way.⁶ Regardless, both commanders and staffs were expected to cooperate in the planning and direction of air attacks. At the next level down, 83 and 84 Group were to be in support of Second British and First Canadian Armies respectively. Control of air forces was not further decentralized beyond this point.⁷

The principle of joint command meant that contrary to the Army's wishes -- in particular the CIGS's wishes -- at no level could Army commanders *order* air support. Air forces were never under the command of Army commanders; both services remained under their own, completely separate, chains of command. In fact, the lowest level at which the two chains of command met was in the person of the Supreme Commander himself, General Eisenhower.⁸ As we shall see, this would remain a contentious issue.

Allied Expeditionary Air Forces

(D-Day through the Normandy)



Source: DHH file 181.006

Figure 2: The Allied Expeditionary Air Forces Chain of Command, showing the system of paired headquarters under the doctrine of joint command.

Doctrine

By 1944, British doctrine for army/air operations had matured considerably. Drawing upon the development process begun by the Wann/Woodall report and the experience of DAF,

two authoritative pamphlets were released in early 1944: *Army/Air Operations: Pamphlet No. 1 General Principles and Organization*, and *Army/Air Operations Pamphlet No. 2 Direct Support*.⁹

This new doctrine specified that the RAF would contribute to the land battle in five principal ways:

- By achieving air superiority over the battlefield.
- By reconnaissance.
- By the attack of ground targets.
- By operations with airborne forces.
- By air transport.¹⁰

Of these five roles, 2nd TAF was primarily concerned with air superiority and the attack of ground targets, and to a lesser extent, reconnaissance. Operations with airborne forces and air transport were performed by glider and transport squadrons, which were not part of 2nd TAF.¹¹ Reconnaissance missions were generally performed by specialist squadrons and were divided between three types: artillery reconnaissance or "Arty/R"; tactical reconnaissance or "Tac/R"; and photographic reconnaissance or "Photo/R". Arty/R was performed by the light observation aircraft of the "Air Observation Post" squadrons, which were actually flown by artillery officers rather than RAF pilots. Each composite group had an organic reconnaissance wing for flying Tac/R missions in support of its paired Army, and these missions were usually focused on the Germans' more immediate rear areas opposite the Army concerned. Directly subordinate to headquarters 2nd TAF was No. 34 Wing, which flew Photo/R missions deeper behind the German lines for "strategical" intelligence.

This left a wide variety of mission types for the bulk of 2nd TAF. First among these was the traditional fighter role of gaining and maintaining air superiority. As the above list of roles suggests, the RAF very much saw its first responsibility as in terms of this classic fighter role.

Indeed, the majority of 2nd TAF's sorties on D-Day were dedicated to this function, rather than ground attack.¹² The air superiority function was discharged by means of a variety of mission types. Defensive patrols were flown, particularly over the vulnerable shipping lanes and invasion beaches; fighter sweeps were mounted through German airspace with the intention of catching Germans in the air and shooting them down, and finally, 2nd TAF fighter aircraft were tasked with escorting medium and even heavy bombers on missions deep behind the lines. The preponderance of such defensive missions fell off throughout the campaign as it became clear how secure Allied air supremacy was.

When it came to the actual attack of ground targets contemporary British doctrine distinguished between "indirect support" and "direct support." *Indirect Support* was defined as "attacks on objectives which do not have an immediate effect on the land battle, but nevertheless contribute to the broad plan."¹³ The main effect of indirect support, according to the doctrine of the time, was "the isolation of the battlefield by hindering the movement of enemy troops and supplies into the area of operations."¹⁴ Typically that involved attacking enemy lines of communication, shipping, bases, rail targets and the like by heavy or medium bombers, but fighter-bombers were used against such targets as well.

On the other hand, *Direct Support* was defined as "attacks upon enemy forces actually engaged in the land battle."¹⁵ Typical targets included defensive positions, hostile batteries of artillery or concentrations of armour.¹⁶ These were generally the province of the composite groups, but any aircraft, from heavy bombers to fighter bombers, could be and were employed for direct support. "Direct Support" is thus generally analogous -- but not identical -- to the modern term "close air support", which did not appear in the official British terminology of

1944. The term close air support was, however, not unknown at the time; Gooderson quotes a DAF paper which uses the term to distinguish between "close air support" and "general air support".¹⁷ General air support was apparently a DAF term for indirect support in the North African context. The term "close support" does frequently appear in contemporary documents, in reference to missions flown against targets on or very close to the front lines.¹⁸ Direct Support was thus a slightly broader term than either close support or the modern close air support. It included not just close support, but also that air power applied behind the lines, but still within the immediate battle area.¹⁹

Direct support missions against targets deeper in German territory could be ordered, in more or less the same fashion as those against targets right along the front line. When panzers or artillery were discovered concentrating in the rear, or key choke points such as a bridge were identified, air attack on these targets could be requested. However, the most common means of dispatching such direct support into the German rear was by means of a mission known as "armed reconnaissance."

Armed reconnaissance, or "armed recce" as it was commonly known, was a mission type in which a group of fighter-bombers were patrolled a given a route or area behind German lines. They would then range over this area, collecting valuable intelligence and attacking any targets of opportunity, with bombs, rockets or strafing.²⁰ This was the mission type that led to so many shot-up German columns on the Norman roads, and it came to be perhaps the most important mission type of the campaign.

Direct support was further categorized on the basis of urgency, distinction being made between "pre-arranged" and "impromptu" requests for air support.²¹ Pre-arranged attacks were

planned through the dedicated staff process, sometimes weeks ahead of time, but routinely for the next day. Impromptu requests were originated in the heat of battle by leading Army elements and forwarded via the special air request radio network first envisioned in the Wann/Woodall report.

Perhaps the most famous means of providing air support was CABRANK, a system of close support in which a package of fighter-bombers, normally four Typhoons but sometimes a whole squadron, circled a specific point just behind the front, available to swoop down upon a target as soon as a forward controller called for support.²² If the ground troops were advancing, the CABRANK could advance with them. If desired, a CABRANK could be maintained for a specified period of time by directing new aircraft in to replace those that had expended their ordnance in an attack or had run low on fuel. CABRANK aircraft were given an alternate target before they took off, which they would attack by default if not directed onto an impromptu target while waiting in CABRANK.²³ The somewhat whimsical name CABRANK presumably arose because of the circling aircrafts' resemblance to the familiar ranks of cabs waiting in front of London's clubs and hotels. In any event, the procedure was immensely popular with the Army, perhaps because the circling aircraft were so reassuringly visible to friendly troops.

Organization

There was a clear understanding that if 2nd TAF was to be at all effective in the new role of supporting armies in the field, it would have to be specifically organized for this purpose. Traditional RAF organization was geared neither to close integration with the Army, nor to

moving headquarters and airfields along behind an advancing front. There was also a clear understanding that a large formation such as 21st Army Group would generate a great volume of air support requests. Quite aside from any doctrinal questions of who would have the authority to approve these requests and through what channels, there would be a requirement for a dedicated staff machinery that could handle the volume of requests in a timely fashion.

To this end, the Wann/Woodall system had resulted in the development of an elaborate organization, all tied together with communications links provided by new beasts known as "Air Support Signals Units" or ASSUs. These were Army units, of some 225 men from the Royal Corps of Signals, which tied all of the various parts together.²⁴ One ASSU was allocated to each Group/Army pairing: No. 1 ASSU (a Royal Canadian Corps of Signals unit) in the case of No. 84 Composite Group/1st Canadian Army; and No. 2 ASSU (a British Royal Corps of Signals unit) in the case of No. 83 Composite Group/2nd British Army.

The parts were many and complex. As we have seen, each Army headquarters was paired with a Composite Group headquarters. Just as headquarters 2nd TAF was meant to co-locate with headquarters 21st Army Group, so the Army and Composite Group headquarters normally co-located. Thus situated, the Army/Composite Group headquarters either formed a "Joint Battle Room" or simply coordinated their separate staffs by constant telephone, meetings and mutual visits -- both methods were tried.²⁵ Regardless, this was the level at which joint army/air force consultation was performed to prioritize fighter-bomber missions and issue direction.

Each of the Composite Groups also had an organization known as a Group Control Centre or GCC. This was the air organization that actually directed and controlled the flying aircraft. The GCC would scramble planes, and vector them to their targets, just as the static

Sector Headquarters had done so famously during the Battle of Britain. Also like the Sector headquarters in Britain, the GCCs were the organizations within 2nd TAF responsible for monitoring the air situation within their own Group area and ensuring the maintenance of air superiority within that area. As such, the GCCs were in communication with and exercised control over all aircraft flying within their sector.²⁶ Since this was a purely air function, the GCC was not normally co-located with either the Group or Army headquarters.

With the forward troops there were various independent wireless detachments, commonly known as "tentacles", apparently since this was what they so resembled on the radio network organization charts.²⁷ These detachments were commanded by an artillery subaltern,²⁸ and they were crewed by three Royal Corps of Signals soldiers, who operated and maintained the radios, and one driver mechanic.²⁹ Normally mounted in a fifteen hundred weight signals truck, they were equipped with two "Canadian Number 9" type wireless sets, which gave them an effective range of about 40 kilometres.³⁰ One of these sets was to tie into the ASSU radio network and pass back air support requests, the other was to receive the latest air reconnaissance reports, which were simply broadcast out from the GCC for all stations to listen in on simultaneously.³¹ Coming from the artillery, the tentacle officers were specialists in fire support and could advise the local ground commander on the employment of air support. However, the primary task of a normal tentacle was to pass air requests from the leading battalion and brigade headquarters directly back to the joint Army/Composite Group headquarters via the ASSU net.³² Standard tentacles did not have any radios that could communicate with aircraft.

This was the system that had grown out of the Wann/Woodall report. Its principal feature was the ASSU radio network to allow the passage of requests for air support directly back to the

controlling authority, without going through the whole intermediate chain-of-command.

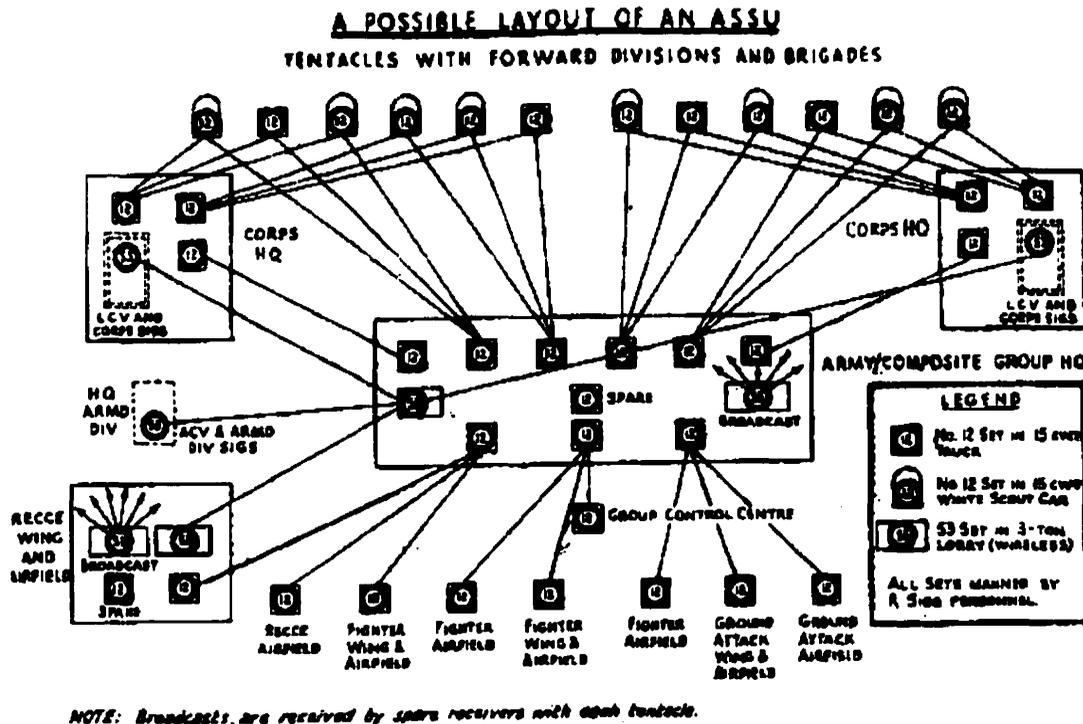


Figure 3: ASSU diagram. Illustration from the 1944 doctrine manual.³³

Additionally, specialized tentacles were developed over time, including VCPs (Visual Control Posts), FCPs (Forward Control Posts) and contact cars, depending upon their exact configuration and equipment. These were modified somewhat over the course of the campaign, and depending on local circumstances and improvisation, but generally they were organized along the following lines.

FCP. Each Army/Composite Group had one Forward Control Post or FCP. These had grown out of the "ROVER DAVID" system developed within the DAF, and like the earlier ROVER DAVID they were special teams for controlling air attacks.³⁴ The intent was to delegate many of the Group/Army Joint Battle Room and GCC functions to this team to focus air power

even more quickly and closely on a critical sector of the front than the normal control procedure could provide.³⁵ As such, there was only one FCP within each Group/Army, and it was deployed to the corps headquarters deemed to be the priority for air support.³⁶ FCPs were much larger than all other types of forward tentacles, generally consisting of 10 personnel all ranks. They were mounted in at least two primary vehicles, either heavy trucks or M14 half tracked vehicles, plus usually a trailer and a jeep.³⁷ The radio equipment included both army type radios for the ASSU net, and TR.1143 VHF radios to speak with aircraft.³⁸ The FCPs' personnel included both an RAF pilot and what was known as an "Air Liaison Officer" or ALO, an officer from one of the combat arms of the Army, trained in the principles and procedures of air support.³⁹ Together, the pilot and ALO were to advise the local ground commander on the optimal employment of air support. Unlike the ordinary tentacles, because they had VHF radios an FCP could talk directly with overhead aircraft, for a range of about 30 to 40 kilometres.⁴⁰

VCP Visual Control Posts or VCPs were an innovation introduced part way through the Normandy campaign, the first one being employed in Operation GOODWOOD on 18 July. Essentially a normal tentacle augmented by an ALO and a fighter-bomber pilot with a VHF radio for communication with overhead aircraft, as the name implies they were meant for directing air strikes onto targets under the VCP's direct observation. The intent was for the RAF pilot to "talk" the strike pilots onto the target "using the language one pilot would use to another."⁴¹ There were three VCPs in each Army/Composite Group⁴², but they were not entirely successful, apparently because in practice they were seldom able to adopt positions that gave good observation of targets.⁴³ In consequence, VCPs came to be employed as de facto miniature FCPs, normally sited with the headquarters of leading brigades or battalions.⁴⁴ VCPs consisted

of a tank or White Scout car rigged with the required radio sets, and a total of five personnel all ranks.⁴⁵

Contact Car A later innovation was the contact car. They were very similar to a VCP, being essentially a normal tentacle augmented with a TR.1143 VHF radio for communication with overhead aircraft.⁴⁶ Coming with the VHF radio was an RAF wireless operator and an RAF pilot.⁴⁷ However, unlike the VCPs and FCPs, in the case of contact cars this pilot was normally a reconnaissance pilot.⁴⁸ Reconnaissance pilots were used because the primary role of contact cars was not to direct air strikes, but to facilitate liaison between reconnaissance aircraft and the leading Army elements.⁴⁹ Indeed, although contact cars had the technical means to operate as VCPs, there is some evidence that policy expressly forbade the pilots in contact cars from attempting to do so.⁵⁰ Apparently contact cars were seldom tasked with the forward control of air attacks.⁵¹

The actual flying squadrons of the Composite Groups were located at airfields as close to the front as possible. In fact, each Composite Group had an organic unit of engineering troops specifically for the purpose of building air fields just behind the advancing armies. Typically, one or two wings of three or four squadrons each would be based at a single airfield. Also at the airfields were ALOs, who were responsible for monitoring front-line developments on the ASSU radio network and through Army channels. Before the pilots took off for missions, the ALOs would briefing them on the ground situation.⁵²

Finally, 2nd TAF had a considerable service support tail, consisting of everything from a field hospital for wounded Air Force personnel to "Servicing Commandos" for repairing aircraft.⁵³

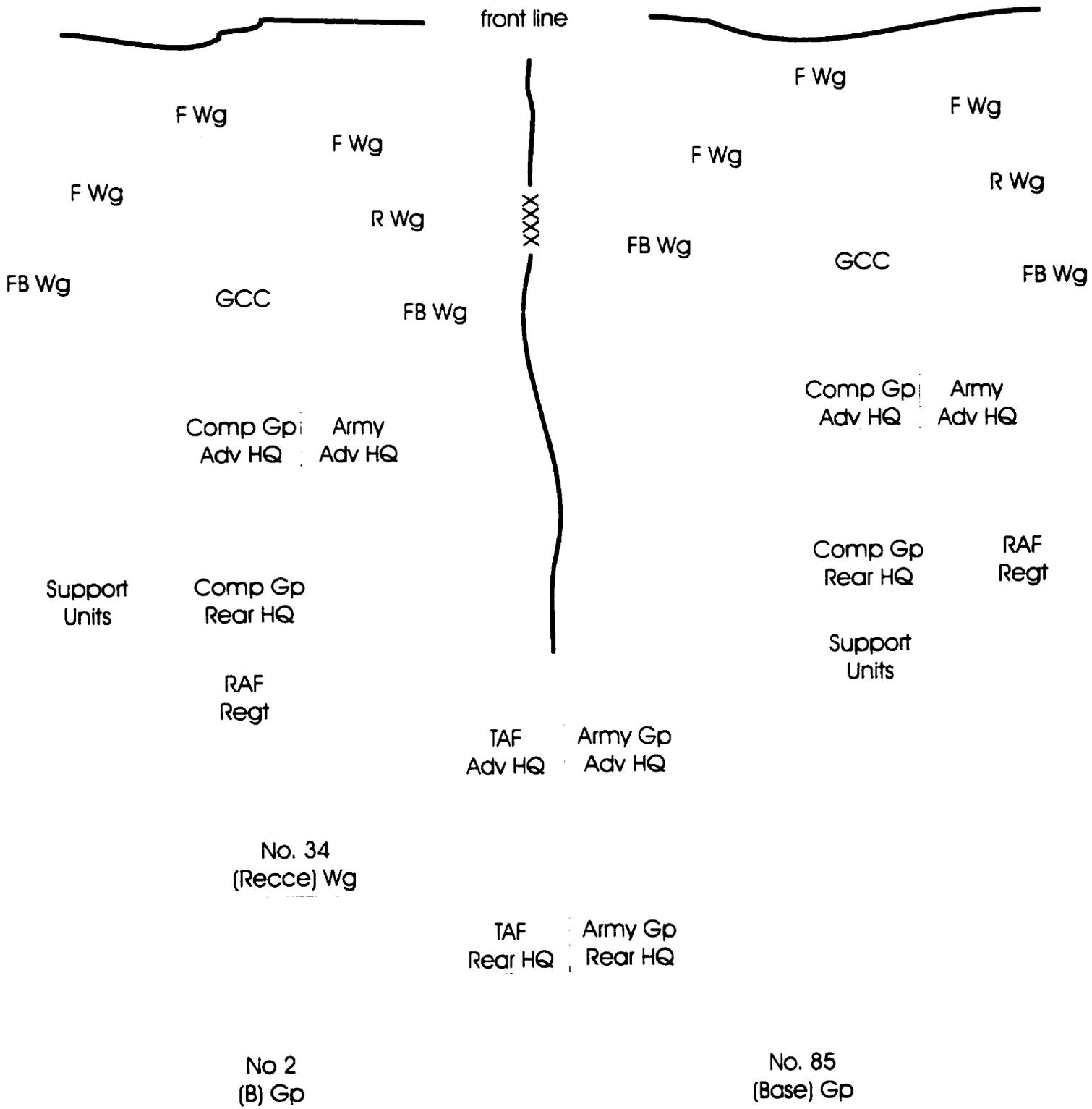


Figure 4: Layout of a Composite Group on the Ground.

Planning and Directing Air Strikes

As we have seen then, 2nd TAF had doctrine, and an elaborately fleshed out organization specifically designed to bring air power to bear upon the German army in the field. How did 2nd TAF and 21st Army Group actually do it? The staffs within 2nd TAF were concerned with various things, in particular the maintenance of air superiority and the everpresent difficulty of the German's low level air defence, or flak. But from the perspective of defeating the Germans in the Normandy campaign, planning the application of air power was primarily concerned with selecting the targets against which that air power should be directed. Experience had shown that selecting targets, and directing aircraft onto them in a timely fashion was "a difficult and controversial subject", as an immediate post-war Army study delicately put it.⁵⁴

Joint RAF/Army staffs dedicated to planning and coordinating air support existed at two levels: the paired headquarters of 21st Army Group/2nd TAF, and at each paired Army/Composite Group headquarters. These were the places where joint RAF/Army staffs existed for the purpose of planning air support. There were also staff officers within the Army at corps, and in some cases divisional, headquarters devoted to planning for air support, but these were Army, not RAF, officers.⁵⁵

At the level of headquarters, 2nd TAF and 21st Army Group, the process was generally dedicated to overall direction and determination of priorities of effort. The heart of the organization for tactical air support lay at the Army/Composite Group level. It was there that impromptu requests were dealt with, and that most of the direct support was allocated. Within the two Army headquarters the dedicated staff for planning air support was the responsibility of a

lieutenant colonel, known as the G(Air) in 2nd British Army and as the G(Ops)Air in 1st Canadian Army, who reported directly to the Army headquarters Colonel General Staff, and was responsible for the air support planning function within the headquarters.⁵⁶

One of the key duties of the Army level air support staffs was the designation of the "bomb line." This was a line drawn on the map forward of the actual front line, beyond which the air forces were free to engage targets.⁵⁷ It was intended as a safety measure to ensure that no friendly troops were mistakenly attacked by Allied air craft. Targets on the near side of the line could be attacked, but only if specifically designated by coloured smoke.⁵⁸

Pre-arranged air support

The centre of the process for planning pre-arranged air support was the air conference at Army/Group headquarters, which was meant to be held every evening but which in practice usually met only approximately every other day.⁵⁹ These were quite large affairs, often attended by some 20 staff officers and chaired by the Army headquarters Chief of Staff.

1st Canadian Army / 84 Group Air Conference⁶⁰

Army

Chief of Staff (COS)
Col GS
GSO1(Ops)
GSO1(Ops) Air
GSO1(Int)
GSO1(CW)
SORE1 Airfds
GSO2 Int (Air Recce)
GSO1 RA
ALO from Recce Wg

RAF

Senior Air Staff Officer (SASO)
Gp Capt Ops
Wg Comd Ops
Gp Int O
Adm Rep
Met O
S/L Airfds
Rep from Gp
Rep from Recce Wg

This conference would discuss the situation and routine operations for the next day and after the conference executive orders for the flying wings would be issued by the Group headquarters, usually by teleprinter.⁶¹ Additionally, specific conferences would be called as necessary to produce "Air Programmes" for major operations.⁶² These plans specified targets and timings, with the intent of integrating air support into the Army plan.⁶³ It is important to note that while the daily air conferences quite naturally tended to fixate upon the immediate issues at hand and mostly concerned the application of 2nd TAF's own air power close to the fighting front, they were not limited to this. These conferences were meant to be the mechanism for planning the application of all air power in the campaign, including that from resources beyond 2nd TAF (ie the strategic bombers). However, things did not always proceed this way; 2nd TAF's staff in particular were somewhat bitter about their perception that General Montgomery had "gone behind their backs" to seek heavy bomber support from higher authorities directly, in particular in his battle for Caen.⁶⁴ In any event, by this process air support plans would be created as integral parts of any planned operations.

Impromptu Request Procedure

Since all of these elements were tied together on a single net by the radio communications of the ASSU, information could be passed about quickly. The intent was to allow the tentacles, often forward with brigade or even battalion headquarters, to pass air requests directly back to Group/Army headquarters, without passing through the intermediate divisional and corps levels of command (see Figure 5). The Army/Composite Group joint air

2
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1
1

staff could then either authorize or deny the request.⁶⁵ The GCC, meanwhile, which was also listening in on the same net, would be concurrently ensuring that the necessary aircraft were ready. Thus, immediately upon the request being authorized, aircraft could be dispatched. As soon as possible, the forward tentacle which had initiated the request would be notified through the ASSU radio network that aircraft were on their way, and their estimated time of arrival.⁶⁶ Based upon this ETA, coloured smoke was often fired by tanks or artillery to indicate the target. If a VCP was forward in the target area, it could establish radio communications with the strike aircraft and talk them onto target. If there was no VCP or FCP present, the Army had to simply wait for the expected air strike. This system gave rise to some misgivings from the Army's point of view, since if the aircraft failed to arrive at the ETA it was not immediately clear if this was because they were delayed or if the strike had been cancelled outright.⁶⁷

If an FCP was forward in the target area, it could shorten the authorization process and improve the communications between the ground formations and the aircraft overhead (see Figure 6). FCPs could fulfill many of the roles of both the Army/Composite Group headquarters and the GCC. Generally, the FCP would co-locate with the headquarters of the lead or assault corps within the Army, and there "listen in" on the calls for impromptu air support from the forward tentacles with that corps' lead elements.⁶⁸ If the FCP commander, in close consultation with the corps commander, heard a request which he considered an appropriate priority, the FCP would "step in" and assume control of that request.⁶⁹ The FCP, which was also in communications with the GCC and all flying aircraft in the area, could direct any available aircraft to that mission, either by diverting aircraft already in the air from some other mission, or by having ready aircraft scrambled from a nearby airfield. RAF pilots with the FCP would

Figure 6: Impromptu Request Procedure with an FCP or VCP forward.

establish communications with the strike aircraft and brief their pilots on the mission over the radio. Alternatively, FCPs were often times given control of a CABRANK circling just behind the corps' lead elements.

General Remarks on the System

Contemporary British doctrine thus recognized three categories of air attacks in support of a land campaign:

	Direct	Indirect
Pre-arranged	Most routine requests for the next day fell into this category, as did the elaborate air programmes laid on for major offensives.	Most interdiction targets and much of the work of No. 2 Group fell into this category.
Impromptu	Most impromptu requests by forward tentacles fell into this category.	

Table 1: Doctrinal categories of air support. See the appendices for examples.

Pre-arranged attacks were staffed through the normal chain-of-command to the joint air staffs at Army/Composite Group and 21st Army Group/2nd TAF levels, either as planned parts of a major offensive, sometimes weeks ahead of time, or as part the next day's routine operations. Alternatively, impromptu requests could be made on the spot by frontline commanders, through the forward tentacles.

However, pre-arranged and impromptu were not entirely distinct. As the doctrine manual of the time put it, "Every effort should be made to foresee future requirements ... impromptu operations can often be anticipated by the issue of provisional orders on a series of alternative

targets."⁷⁰ One means of bridging the gap between pre-arranged and impromptu air support was the system known as TOBY.⁷¹ Suspected targets would be identified via the normal air planning process and given code names. The supported army formation could then request those strikes by the code name, and the Air Force would be prepared to launch them with no further details required. No missions would be flown until the Army requested them.

The CABRANK system was another means of bridging the gap between pre-arranged and impromptu air support. CABRANK amounted to a planned allocation of aircraft to potential targets of opportunity. Similarly, a certain portion of 2nd TAF's assets were routinely left unallocated, so as to be available for immediate scrambling in response to impromptu requests.

Finally, requests for indirect attacks, made through the normal staff machinery, could in exceptional circumstances become de facto "impromptu indirect" missions. There are several examples on record of urgent requests for attacks on targets in the German rear being actioned the same day the target became known. For instance on 30 June, during the course of the EPSOM offensive, the Army reported that German armour was concentrating in the Villers Bocage area, then about a dozen kilometres in the German rear, threatening the flank of the British advance.⁷² Headquarters Advanced AEF hurriedly passed a request back to Bomber Command, and at 2000 hours of that same day, 232 heavy bombers struck the target area.⁷³

The lead time for air support thus varied from plans drawn up days or even weeks ahead of time, to routine requests for air support the next day. The timeliness of response to impromptu requests varied as well. A pre-invasion planning document suggested that staffs should expect the average wait to be from one hour and 45 minutes to two hours and 45 minutes, but that was for UK based aircraft.⁷⁴ By some accounts, impromptu requests, if filled from within the

Composite Group's own squadrons, averaged about an hour from the application for an air strike to the appearance of the aircraft on target.⁷⁵ By other accounts, it could take several hours, unless an FCP or VCP was present.⁷⁶ At the other extreme, if there was a CABRANK available with an FCP or VCP, aircraft could be diverted onto the target even more quickly, sometimes within minutes.

1.. John Terraine, *The Right of the Line: The Royal Air Force in the European War 1939-1945* (London: Hodder and Stoughton, 1985) p 352.

2.. Ibid, p 565.

3.. Ibid.

4.. Ibid.

5.. Headquarters No. 84 Group, "Organization of Staffs and Operations Rooms at R.A.F. Composite Group and Army Headquarters" no date, probably late 1944, PRO AIR 2/7870.

6.. In fact, this became the subject of some friction. See the "Command Disagreements" section of chapter three below.

7.. Major General Mann, *An Analysis of the System for Direct Air Support in the North West Europe Campaign*, 1946, NAC RG 24 Vol 10671. Actually, the doctrine extant during the Normandy campaign did provide for decentralization below Army/Group level "for a specific operation", but this was never in fact done throughout the north west Europe campaign.

8.. Ibid.

9.. War Office, *Army/Air Operations Pamphlet No. 1 General Principles and Organization* (26/GS Publications/1127), 1944 and *Army/Air Operations Pamphlet No. 2 Direct Support* (26/GS Publications/1181), 1944. Both were edited and largely the work of Lieutenant Colonel C.E. Carrington. His memoirs of his work in air support development, *Soldier at Bomber Command* (London: Leo Cooper, 1987) are of enormous value to understanding the development of air support doctrine. He was also an interesting figure in his own right, probably best known as the author of *Soldier From the Wars Returning, A Subaltern's War* and a fine biography of Kipling.

- 10.. WO, *Army/Air Operations (1) General Principles and Organization*, p 7.
- 11.. No. 46 Group, which came directly under AEAFF headquarters, consisted of five squadrons of Dakota transport aircraft.
- 12.. See chapter three below.
- 13.. The wording is that of Air Vice Marshal W.F. Dickson, "Address to Headquarters 1st Canadian Army" 7 June 1943, NAC RG 24 Vol 10671 file 215C1.093.
- 14.. WO, *Army/Air Operations (1) General Principles and Organization*, p 8.
- 15.. Ibid.
- 16.. Ibid.
- 17.. Gooderson, *Air Power at the Battlefield*, pp 2-3.
- 18.. For example, the term appears in numerous entries in the Operations Record Books of both No. 83 Group (PRO AIR 25/704) and No. 84 Group (PRO AIR 25/709).
- 19.. This makes the 1944 conception of "direct support" more or less equivalent to a combination of the modern concepts of "Close Air Support" and "Battlefield Air Interdiction". For more on the modern concepts see Air Vice Marshal R.A. Mason *Air Power: An Overview of Roles* (London: Brassey's Defence Publishers, 1987) p 66.
- 20.. War Office, *Air Support and Air Reconnaissance, Aspects of Combined Operations in North West Europe, June 1944 - May 1945* immediate post war report found in PRO AIR 37/881, (hereafter cited as *Air Support and Air Recce*), Chapter 3 p 10. See also Gooderson, *Air Power at the Battlefield* pp 199-201 for an examination of the tactic of armed recce.
- 21.. WO, *Army/Air Operations (2) Direct Support*, p 12.
- 22.. Air Historical Branch, *Air Support* (Air Ministry, Air Publication 3235, 1955) originally classified post-war report, p 149.
- 23.. *Air Support and Air Recce*, Appendix H to Chapter 3, paragraph 5.
- 24.. Canadian Army, "Organization and Employment of 1 Canadian ASSU" 8 March 1944, NAC RG 24 Vol 10671 file 215C1.093(D2).
- 25.. A paper "Organization of Staffs and Operations Rooms at R.A.F Composite Group and

Army Headquarters" (found in PRO AIR 2/7870) thoughtfully compares these two methods, and comes to the sensible conclusion that separate operations rooms are best when the Air Force must fight its own campaign for air superiority, but that a single joint operations room is best in conditions of friendly air superiority.

26.. WO, *Army/Air Operations (2) Direct Support*, p 1.

27.. Shelford Bidwell and Dominick Graham, *Fire-Power: British Army Weapons and Theories of War 1904-1945* (London: George Allen & Unwin, 1982) p 265.

28.. There is some confusion about this. Originally, ALOs were used, but according to Bidwell and Graham, this was discontinued in early 1944, *Firepower*, p 266. However, the memo "Organization and Employment of 1 Canadian ASSU" 8 March 1944, NAC RG 24 Vol. 10671 file 215C1.093(D2) states that there were officers in every tentacle, but that artillery subalterns (ie lieutenants) rather than actual ALOs were used.

29.. *Air Support and Air Recce*, Chapter 4, para 4.

30.. Ibid, Chapter 2 p 4. For information on the Canadian No. 9 radio set, see *Wireless for the Warrior Volume 1*, a history of Second World War military radios held at the Communications and Electronics Branch museum in Kingston Ontario.

31.. Ibid.

32.. WO, *Army/Air Operations (1) General Principles and Organization*, p 22.

33.. Diagram is reproduced from *Army/Air Operations (2) Direct Support*.

34.. The original Forward Control Unit or "FCU", first employed on 23 October 1943 in Italy, was commanded by one Group Captain David Heysham, hence the term "ROVER DAVID". For an account of this see Richard Townsend Bickers *Air War Normandy* (London: Leo Cooper, 1994) pp 150-153, or Peter C. Smith *Close Air Support: An Illustrated History 1914 to the Present* (New York: Orion Books, 1990) pp 97-98.

35.. *Air Support and Air Recce*, Appendix H to Chapter 3, para 1.

36.. Ibid.

37.. Memo "Forward Aids to Air Support", 1 September 1944, NAC RG 24 Vol 10671 file 215C1.093.

38.. Memo, "Report by CSO 83 Group on the Operation of Signals During 1944", February 1945, PRO AIR 37/333.

39.. To avoid possible confusion, it should perhaps be noted that in modern US terminology an "ALO" is an Air Force officer detached to the Army, whereas an Army officer working with the Air Force is a Ground Liaison Officer or "GLO." Regardless, in Second World War British parlance, ALOs were Army officers working with air support. They were generally junior officers from the combat arms who had been given a short course in air support doctrine and procedures, and they were employed either as tentacle officers, or back at the fighter-bomber airfields to brief the pilots on the ground situation. Farelly Mowat was briefly employed as an ALO.

40.. Memo, "Report by CSO [Chief Signals Officer] 83 Group on the Operation of Signals During 1944", February 1945, PRO AIR 37/333.

41.. Bidwell and Graham, *Firepower* p 267.

42.. Some sources state that there was only one VCP per Army/Composite Group. However, AIR 37/333 "Report by CSO [Chief Signals Officer] 83 Group on the Operation of Signals During 1944", February 1945, para 93, states that there were three. Also, various air programmes, for instance for Op TOTALIZE, include tasks for more than one VCP (for example "Op TOTALIZE - AIR PROGRAMME" 6 August 1944, NAC RG 24 Vol 10671 file 215C1.096(D3)).

43.. Main Headquarters 21st Army Group, "Notes on Air Support June-October 1944" November 1944, PRO WO 205/556, p 5.

44.. There is a certain amount of confusion about this. Gooderson, *Air Power at the Battlefield*, p 27, states that experience in Normandy showed VCPs could seldom exercise visual control over air strikes and so "were modified to become small forward air-support controls. They became known as ... FCPs." However, FCPs were *larger* than VCPs, and it seems clear that FCPs were developed *before* VCPs. Apparently, what happened is not that VCPs became FCPs, but that VCPs came to be employed as de facto miniature FCPs. For details on VCP and FCP organization and equipment, see: Headquarters 2nd TAF Memo "Forward Direction of Aircraft" 16 September 1944, PRO AIR 2/7870, para 6; Main Headquarters 21st Army Group, "Notes on Air Support June-October 1944" November 1944, PRO WO 205/556; and *Air Support and Air Recce*, Chapter 4.

45.. Memo "Forward Aids to Air Support" 1 September 1944, NAC RG 24 Vol 10671 file 215C1.093.

46.. "Report by CSO [Chief Signals Officer] No. 83 Group", AIR 37/333, paras 93-96.

47.. *Air Support and Air Recce*, Chapter 4, para 4.

48.. Memo "Forward Aids to Air Support", 1 September 1944, NAC RG 24 Vol. 10671 file 215C1.093.

49.. There is some confusion about this; many secondary and some primary sources describe "contact cars" as filling the roles of VCPs and FCPs. The authoritative primary documents, however, appear quite clear. Contact cars were initiated to improve contact between leading Army elements and the RAF, primarily for the purposes of improving the RAF understanding of where friendly troops were on the ground, and secondarily to improve Army appreciation of what reconnaissance information RAF aircraft could provide. As Air Vice Marshal Broadhurst recalled, "The reason why I instituted them was... to report the position of our own army at any moment and to control the tactical reconnaissance aircraft." Quoted in Hilary St George Saunders *Royal Air Force 1939-1945 Vol. II The Fight is Won* (London: HMSO, 1954) pp 135-136. See also WO, *Army/Air Operations (1) General Principles and Organization*, p 23 or Memo "Forward Aids to Air Support" 1 September 1944, NAC RG 24 Vol 10671 file 215C1.093.

50.. A wartime memo commenting on air support procedures by a staff officer from the headquarters of 51 (H) Div observed that "where a recce pilot with a VHF set is occasionally attached to a division [ie a contact car]... the recce pilot is not permitted to speak to or brief close support sorties, although it appears that he has the means at hand." Memo "British and American Methods of Air Support" 7 March 1945, PRO WO 205/546.

51.. *Air Support and Air Recce*, Appendix H to Chapter 3, para 7, states that they could "call for and control an offensive strike or strikes when necessary." Gooderson asserts that FCPs were often reluctant to delegate this role to contact cars because of concerns that their personnel were not sharp enough, *Air Power at the Battlefield*, p 31.

52.. *Army/Air Operations (2) Direct Support*, p 3 para 6. *Air Support and Air Recce*, Chapter 5. See also Gooderson, *Air Power at the Battlefield*, p 25.

53.. For an account of some of these unsung efforts, see J. Davies and J.P. Kellet, *A History of the RAF Servicing Commandos* (Shrewsbury: Airlife Publishing, 1989). Christopher Shores, *Second Tactical Air Force* (Reading: Osprey Publications, 1970) also gives an overview of the myriad ground support that it took to put 2nd TAF in the air.

54.. *Air Support and Air Recce*, Chapter 1, para 20.

55.. Every corps headquarters had a GSO2(Air) and another officer, presumably a junior staff officer. Armoured divisions had a GSO3(Air), although he was also employed for other duties. *Air Support and Air Recce*, Chapter 3, para 7.

- 56.. Ibid, Chapter 3, para 1.
- 57.. Gooderson, *Air Power at the Battlefront*, p 25.
- 58.. Ibid, p 34.
- 59.. *Air Support and Air Recce*, Chapter 3, para 12.
- 60.. Ibid, Chapter 3, para 13. The organization of the daily air conference at headquarters No. 83 Group/2nd British Army was similar, but somewhat smaller.
- 61.. Ibid, Chapter 3, para 12-14.
- 62.. Ibid, Chapter 3, para 14. This Army report somewhat sardonically notes that "RAF representatives with the necessary powers of decision were not always forthcoming."
- 63.. Formal air programmes were drawn up for Operations NEPTUNE, EPSOM, GOODWOOD, TOTALIZE and other such major offensives, as well as smaller Operations such as SPRING or ATLANTIC.
- 64.. Memo, "Report on Visit to 84 Group on the 28th July 1944", PRO AIR 2/7870.
- 65.. *Air Support and Air Recce*, Chapter 3 para 16.
- 66.. *Army/Air Operations (2) Direct Support*, p 2.
- 67.. Headquarters 51 (H) Div, Memo "British and American Methods of Air Support" 7 March 1945, PRO WO 205/546.
- 68.. *Air Support and Air Recce*, Appendix H to Chapter 3, para 3.
- 69.. Ibid.
- 70.. *Army/Air Operations (2) Direct Support*, p 12.
- 71.. Ibid.
- 72.. RAF post-war narrative, *The Liberation of North West Europe, Vol IV, The Breakout and the Advance to the Lower Rhine, 12 June to 30 September 1944*, PRO AIR 41/67 p 20.
- 73.. Ibid, p 21.

74.. Headquarters 21st Army Group/Allied Expeditionary Air Force "OVERLORD: Direct Air Support" 23 April 1944, PRO WO 205/182

75.. Memo, "Report on Visit to 84 Group on the 28th July, 1944", PRO AIR 2/7870. Of this time, about 15 minutes were taken by flying time. The author, an Army officer, noted "This seems to me a hell of a long time but he [SASO 84 Group, Air Commodore McEvoy] seemed quite satisfied with it."

76.. Headquarters 51 (H) Div, Memo "British and American Methods of Air Support" 7 March 1945, PRO WO 205/546.

INTERLUDE: THE MACHINES

Traditionally the RAF may have resisted specialized aircraft for providing tactical support to ground troops, but by June 1944 2nd TAF found itself with an array of machines specifically modified for just this role. These included a selection of reconnaissance aircraft, but for ground attack against the German army there were two categories that mattered: fighter-bombers and light/medium bombers.

Fighter Bombers

Reflecting their hybrid name -- and doubtless RAF proclivities -- all fighter-bombers were expected to engage enemy aircraft in the air, whenever and wherever they should meet them. Nevertheless, by June 1944 the RAF fighters of 2nd TAF had all been considerably modified to maximize their ability to strike ground targets. Fighter-bombers had several means of attacking ground targets.

Bombs. Despite not having been designed for it, eventually bombs were fitted to nearly all of the RAF's fighters. On lighter airframes like the Spitfire, a single 500 pound bomb, or two 250 pounders, were used. Heavier models like the Typhoon carried up to two 1000 pound bombs. These were sometimes delivered in low level bomb runs, but more commonly by dive bombing, notwithstanding the RAF's traditional aversion to dive bombers. Most bombing attacks by Spitfires and Typhoons were made in steep dives -- 45 to 60 degrees -- with release at two to three thousand feet, which was far more accurate than conventional bombing.¹

Guns. Fighter strafing of ground targets had a long history, going back to the First World War. In late 1941 the CIGS, General Sir Alan Brooke, was greatly impressed by a demonstration of fighters making a strafing attack on lorried infantry and towed artillery.² By June 1944 the technique was well developed, and with 20mm cannon fire, could even tackle armoured vehicles. Directed against columns of trapped vehicles and their crews on the narrow and restricted Norman roads, strafing was quite probably the most effective form of fighter-bomber attack.³

Rockets. In June 1944 rockets, or "RP" (rocket projectiles) as they were commonly known, were still a comparatively new development. Typhoons were first fitted with them in 1943, but by the time of the Normandy campaign they were in wide use by 2nd TAF's Typhoon squadrons.⁴ Rails were fitted under the aircrafts' wings, and eight rockets were mounted on each Typhoon. The 3-inch diameter rockets used at that time were unguided "fire-and-forget" weapons with a 60 pound, high explosive/semi-armour piercing warhead.⁵ They were intended for use against tanks, and were generally fired in salvo, all eight at once, from Typhoons in a 30 degree dive.⁶ More recent literature has cast serious doubt upon their accuracy in the anti-tank role, which required pinpoint accuracy, but they seem clearly to have had a tremendous morale effect, especially on the crews of columns of vehicles trapped on roads.⁷

Overall, there were several critical limitations on the effectiveness of 2nd TAF's fighter-bombers. Because of fuel capacities, they all had quite limited range, averaging approximately 750 kilometres, without external fuel tanks. This also affected the length of time that they could remain in the air, on either defensive patrol or CABRANK. Considering the return trip and loiter time over the target area, this gave an effective operational radius of little more than 150 km from their

airfields.⁸ Secondly, the fighter-bombers of 1944 were essentially day-light only machines, with marginal capacity in the dark. Second TAF's medium bombers did operate in the hours of darkness, but the fighter-bombers did not. Finally, the aircraft of the time were incapable of operating effectively in fog or cloud, and the weather was often poor during the summer of 1944.

Spitfire

The Spitfire was a single-seat, single-engine fighter. The design dated back to the S.6B racing plane, which won the prestigious Schneider Trophy in 1931. Originally conceived as a "pure" fighter -- ie designed solely for attacking other aircraft in flight and "dog-fighting" -- the first military version made its maiden flight on 5 March 1936.⁹ From the first, the Spitfire impressed everyone with its speed and manoeuvrability, and the Battle of Britain sealed its fame in this regard. During the Battle of Normandy, 2nd TAF's compliment of Spitfires consisted primarily of Spitfire Mark IXs, and some Mark Vs. The Mk V was the first version specifically modified for use as a fighter-bomber, appearing in February 1941.¹⁰ The Mk IX was originally conceived as a temporary stop-gap, based upon the Mk V design, until the Mk VIII which included an all new engine, could begin production in numbers. In the end, however, more Mk IXs were produced than any other variant and it formed the back-bone of 2nd TAF's Spitfire force.¹¹

Mk	Speed	Range	Fixed Armament	Bomb Load
V	374 mph at 13,000 ft 357 mph at 6,000 ft	470 miles (clean)	8 x .303 M/G; or 2 x 20mm gun, 4 x .303 M/G	1 x 500 lbs; or 2 x 250 lbs
IX	408 mph at 25,000 ft	434 miles (clean) 980 miles (tanks)	2 x 20 mm gun, 4 x .303 M/G	up to 1000 lbs

Table 2: Spitfire Specifications.¹²

Typhoon

The Typhoon was a single-seat, single-engine fighter-bomber. It too began life as a "pure" fighter, but unlike the Spitfire it was not a success in this role.¹³ However, its rugged and heavy build proved to be just the thing for carrying the extra ordnance required for the ground attack role, and the Typhoon became the backbone of 2nd TAF's ground attack force, specializing in particular in carrying the 3-inch rocket.

Mk	Speed	Range	Fixed Armament	Bomb Load
IB	412 mph at 19,000 ft	510 miles (loaded) 980 miles (tanks no bombs)	4 x 20mm gun	2 x 1000 lbs; or 8 x RP

Table 3: Typhoon Specifications¹⁴

Light/Medium Bombers

Unlike the fighters, which were considerably modified to become tactical air force fighter-bombers, 2nd TAF's medium bombers were relatively unchanged from their original form. No. 2 Group, where 2nd TAF's medium bombers were held, had been a pre-war RAF formation, and entered the 2nd TAF order of battle as an already experienced bomber group. It was generally used against deeper targets than the fighter-bombers, concentrating in particular upon the German lines-of-communication and support facilities. Unlike the fighter-bombers, who could bomb, strafe or rocket targets, medium bombers had only one weapon -- their bombs. Furthermore, they were less agile in the air and were not used in impromptu attacks, CABRANKs, or armed reces as the fighter-bombers were. However, their bomb load and range were greater, and they could, and did, operate at night. They bombed from level flight in more or less the same way that the heavy bombers did, although often from somewhat lower altitudes, which improved their accuracy but made them more susceptible to flak. The Mosquito, with its remarkable performance characteristics, was an exception to this, and was used in something of a fighter-bomber role.

Mosquito

The Mosquito, a two-seat, twin engine machine, is generally considered one of the outstanding British aircraft of the war.¹⁵ Using a unique wooden body design, it had outstanding speed and manoeuvrability, combined with a greater load carrying capacity than a fighter-bomber. The Mosquito was also versatile. Aside from reconnaissance variants, Mosquito VIs were used as

light bombers by No. 2 Group, and Mosquito XIII and XXXs were used as fighter-bombers by No. 85 Group.

Mk	Speed	Range	Fixed Armament	Bomb Load
VI	380 mph at 13,000 ft	1,205 miles (loaded) 1,705 miles (tanks)	4 x 20mm gun, 4 x .303 M/G	4 x 500 lbs
XXX	408 mph at 25,000 ft	434 miles (clean) 980 miles (tanks)	2 x 20 mm gun, 4 x .303 M/G	4 x 500 lbs

Table 4: Mosquito Specifications¹⁶

Boston

The Boston was a four-man, two engine, medium bomber, produced in the United States. The first Bostons were shipped to the UK in 1941, entering service with No. 2 Group squadrons that year. Upon the formation of 2nd TAF, and No. 2 Group's assignment to this new force, they continued in service up to the end of the war, serving with a third of No. 2 Group's squadrons.

Mk	Speed	Range	Fixed Armament	Bomb Load
III	304 mph at 13,000 ft 205 mph cruising	1,020 miles (bombs)	6 x .303 M/G	2000 lbs

Table 5: Boston Specifications¹⁷

Mitchell

Like the Boston, the Mitchell was an American import. A five-man, two engine, medium bomber, it first gained fame on 18 April 1942, when General Doolittle lead a force of Mitchells from the US aircraft carrier *Hornet* in a daylight raid on Japan. Mitchells served with six of No. 2 Group's twelve squadrons.

Mk	Speed	Range	Fixed Armament	Bomb Load
II	292 mph at 15,000 ft 210 cruising	1,635 miles (1/2 load) 950 miles (max load)	6 x .50 M/G	6000 lbs

Table 6: Mitchell Specifications¹⁸

- 1.. Gooderson, *Air Power at the Battlefront*, p 71.
- 2.. Arthur Bryant, *The Turn of the Tide 1939-43: A Study Based on the Diaries and Autobiographical Notes of Field Marshal The Viscount Alanbrooke, F.G. O.M.*, (London: Collins, 1957), p 237.
- 3.. Alfred Price "The 3-in Rocket" (*RAF Quarterly*, Summer 1975, pp 127-131),, p 130.
- 4.. Christopher Shores, *Ground Attack Aircraft of World War II*, p 111.
- 5.. Price "The 3-in Rocket", p 127.
- 6.. Ibid.
- 7.. See in particular Gooderson, *Airpower at the Battlefront*, pp 75-76 & Chapter 5, although the issue was first raised as early as 1975 by Price, *ibid*.
- 8.. Gooderson, *Airpower at the Battlefront*, p 64.

- 9.. Owen Thetford, *Aircraft of the Royal Air Force Since 1918* (London: Putnam & Company, 1979 edition) p 481.
- 10.. Ibid, p 483.
- 11.. Bill Sweetman "Spitfire" *The Great Book of World War II Airplanes* (New York: Wing and Anchor Press, 1984) pp 269-316, p 291.
- 12.. Thetford, *Aircraft of the Royal Air Force Since 1918*, p 489.
- 13.. See for instance, Chaz Bowyer, Arthur Reed & Roland Beamont, *Mosquito Typhoon Tempest at War* (London: The Promotional Reprint Company, 1997) p 170, or Gooderson p 59.
- 14.. Thetford, *Aircraft of the Royal Air Force Since 1918*, p 352.
- 15.. Ibid, p 192.
- 16.. Ibid, p 202.
- 17.. Ibid, p 226.
- 18.. Ibid, p 420.

CHAPTER THREE: PROBLEMS

Although 2nd TAF represented an elaborate organization specifically dedicated to army support, throughout the Normandy campaign the relationship between the Army and RAF was strained and often contentious. The rocky relationship of course dated back to the inter-war years, and it centred first of all around the old issue of command relationships. General misgivings with command arrangements were further poisoned during the campaign by various instances of bombing short and mistaken air attack of friendly troops. However, beyond those specific issues, there was a general Army complaint that the RAF was too slow and unresponsive to requests for support, if not downright stinting.

Command Arrangements

Second TAF came under Headquarters Allied Expeditionary Air Forces (AEAF), command of which had been given to Air Chief Marshal Leigh-Mallory. The AEAF came directly under the Supreme Commander for OVERLORD, General Eisenhower. However, as can be immediately seen in Figure 2 (p 24), while Leigh-Mallory served as the overall air commander for OVERLORD, there was no overall ground forces commander, other than the Supreme Commander himself.

Further complicating all of this, although he was air commander for the invasion and subsequent continental campaign, Leigh-Mallory did not control all of the available air forces. Control of the heavy bombers, as "strategic forces" was not given to Leigh-Mallory. Any requests

for their support, or coordination of their and the OVERLORD forces' efforts, had to be arranged through Air Staff channels, via both British and American national command elements. Air Chief Marshal Tedder, was appointed as Deputy Supreme Commander under Eisenhower, with special responsibility for just this issue.¹

A final wrinkle was added by a series of temporary arrangements for the immediate purposes of the invasion itself. It was quite naturally felt that for the assault phase of OVERLORD, especially while operations consisted only of five narrow beaches and three airborne divisions, there must be one single ground commander. Therefore, for the first phase of OVERLORD, Montgomery was appointed the overall ground forces commander, directly subordinate to Eisenhower, a role he subsequently held until 1 September. In a similar fashion, the entire AEAFF headquarters was considered too unwieldy for amphibious operations, so Coningham was designated the commander of "Advanced AEAFF", a role he held until 5 August.² Further down the chain-of-command, No. 84 Group's squadrons were initially put under the control of headquarters No. 83 Group, as 2nd British Army (the formation paired with No. 83 Group) was the assault Army within 21st Army Group, headquarters 1st Canadian Army not becoming operational until 23 July. Given the communications limitations the Allies faced in 1944, and the inherent awkwardness of an amphibious invasion, some jury-rigging of command arrangements was certainly unavoidable. However, these inherent difficulties were compounded by both the bitter inter-service rivalries outlined in chapter one, and also by some bitter personality clashes between key commanders. Organization charts of command arrangements often seem dry and lifeless, but they reflect two crucial underlying factors: doctrinal roles and personal relationships. Having outlined the often intense debate over doctrinal roles, it is appropriate now to turn to the actual personalities involved.

Command Disagreements

The key personal relationship affecting British and Commonwealth air power in the Normandy campaign was that between Montgomery and Coningham. As the commanders of 21st Army Group and 2nd TAF respectively, theirs were the two headquarters specifically paired under the joint command doctrine. Initially they were also opposite numbers as the acting overall ground commander and the acting overall air commander. This might therefore be thought a balanced symmetry. The doctrine of joint command required an "intimate" relationship between the ground and air commanders, a sentiment that had been often stressed since the creation of the first tactical air force in the deserts of North Africa. Montgomery himself wrote in 1943:

Army plus Air ... has to be so knitted that the two together form one entity. ... the Army and Air Staff must sit together at the same headquarters. There must be between them complete mutual confidence and trust. ... My headquarters and the headquarters of the Air Support Force must be together. ... That mutual confidence and trust, starting with the Air Vice-Marshal and myself, must go right down.³

However, Montgomery was conscious that, for whatever reasons, in the months before D-Day there was "a definite gulf in England between the Armies and their supporting air forces" as he put it himself.⁴ On 4 May he went so far as to release a statement to his army commanders stressing that:

I feel very strongly on the whole matter [of Army/Air cooperation], and I know that we can achieve no real success unless each Army and its accompanying Air Force can weld themselves into one entity. The two HQ have got to set themselves down side by side, and work together as one team; that is the only way.⁵

Unfortunately, Montgomery honoured this philosophy more often in word than deed. Even while penning letters such as the above, he had not co-located his own headquarters with his Air Force opposite number. Coningham recalled:

The C-in-C 21 Army Group [Montgomery] was located at Fort Southwick, near Portsmouth; the Air C-in-C [Leigh-Mallory] was located at Stanmore; my Headquarters was at Uxbridge, though I stayed with the Army Group Commander at certain important periods.⁶

The administrative difficulties of siting both headquarters at one location may account for this, but it nevertheless presaged a real breakdown in the relations between Montgomery and Coningham, relations which had previously been close. Terraine dates this breakdown from Second Alamein in North Africa, when Coningham criticized Montgomery for an over-cautious pursuit of the retreating Germans: "The breakdown of relations between the soldier and the air marshals, which would have such evil consequences in 1944, seems clearly to date from the frustrations of this period."⁷

D'Este stresses another and less flattering explanation for the rift that opened up between the two senior commanders; Coningham was an ambitious and ruthless man who believed that Montgomery had "stolen" all of the recognition for the desert victories:

In the desert the two men had worked in close harmony, living side by side in caravans and closely coordinating air-ground actions. When Montgomery gained fame and massive publicity for his victory over Rommel the ambitious Coningham felt slighted and from that time forth relations deteriorated to the point where Montgomery in Normandy would deliberately bypass Coningham; this only intensified their bad relations as the frustrated air marshal constantly criticized Montgomery's actions.⁸

Montgomery reciprocated these feelings, writing to Brooke just as the Normandy campaign wound up:

Coningham is violently anti-army and is disliked and despised by all soldiers; my army commanders mistrust him and never want to see him ... For my part I am very distressed about the air set-up.⁹

It is unclear who was the more at fault in this dispute.¹⁰ Certainly Montgomery was a notorious publicity seeker with a sizeable ego, which put off others besides Coningham; Tedder too was no friend of Montgomery's.¹¹ Like Terraine, D'Este dates this friction from the pursuit after Alamein and concludes that Montgomery resented being given advice by Tedder.¹² Neither did Montgomery help matters any by deliberately by-passing Coningham and dealing directly with Leigh-Mallory on issues concerning the strategic bombers, and directly with Air Vice-Marshal Broadhurst on tactical matters.¹³ For his part, Air Vice-Marshal Broadhurst, who apparently managed to establish a very good working relationship with both his opposite number, Lieutenant General Dempsey commanding 2nd British Army, and Montgomery, felt himself caught between Coningham and Montgomery in a personal grudge that damaged the war effort.¹⁴

Yet this was not the only personality clash bedeviling the higher direction of the air war. Coningham disapproved of Air Vice Marshal Brown, who commanded 84 Group, on the grounds that he was too subservient to the Army.¹⁵ Tedder disliked both Coningham, who he at least respected,¹⁶ and Leigh-Mallory, confiding to all the world in his memoirs that: "Leigh-Mallory, though earnest, zealous and brave, did not inspire confidence as Commander of the Allied Expeditionary Air Forces."¹⁷ Leigh-Mallory, in turn, believed that the hierarchy of the RAF, in the particular form of Tedder and Coningham, was not applying itself properly to the battle, and that only he was determined to give the Army the air support it deserved. On 8 July he recorded in his diary:

The policy of double-dealing [by Tedder and Coningham], the effect of which has been to deny the Army what it wanted in the field, has failed. Monty wishes to deal in future direct with me, and we have told Eisenhower so ... If he [Coningham] does not like the situation, he will have to clear out. If Tedder does not like it, then he or I will go. My mind is now fully made up. Either I am to be allowed to direct, if necessary, the whole Air Forces available to the full and immediate support of the Army, or I shall resign on that issue.¹⁸

In the second half of July Tedder actually fomented a plot to try and have Montgomery removed, a prospect Coningham fully supported.¹⁹ But in the end, Brown was the only casualty, fired by Coningham after the Normandy campaign. Leigh-Mallory never did resign, and neither did Tedder. The whole system just limped along, bruised egos and bad blood poisoning army/air cooperation for the duration of the campaign.

Bombing Short

Another issue poisoning relations was Air Force bombing short and causing Allied casualties. This was a well documented problem, and it made the RAF demonstrably unwilling to take on targets too near the front line.²⁰ Paradoxically, reluctance to accept targets often further aggravated the Army's perception of RAF uncooperativeness. A sense of the Army's aggravation over what they considered the RAF's laxness with Allied troops' own safety is conveyed by an indignant message from 1st Canadian Army to Montgomery's headquarters. In it, the 1st Canadian Army Chief of Staff personally complained that their troops had just picked up a downed RAF pilot, one Flying Officer Clayton, who, upon questioning was found to "NOT know bomblines."²¹ This, the message went on, "does not seem justifiable in any circumstance and particularly after yesterday's DEBACLE."²²

Accusations from the Army

However, heated as the personal frictions at the highest levels were, and dramatic as the

bombing short issue could be, these were not the chief complaints from many in the Army. Only a year after the war, Major General C.C. Mann, who as a Brigadier had been the very same Chief of Staff at 1st Canadian Army headquarters who had sent the Flying Officer Clayton message cited above, made a striking and surprisingly blunt accusation.

I am convinced that ... this conception -- that war like operations can be conducted with maximum efficiency under a system of Joint Command at this level -- is unsound...²³

Mann strongly believed that the nature of the co-equal command relationship between the paired army and RAF headquarters was unworkable.

While, in the main, the events of the campaign bear out the wisdom of the doctrine [of air support], nevertheless they disclosed, beyond all doubt, certain serious weaknesses. These weaknesses can be grouped under the heading "Human Factors". This is the fundamental problem. It is inevitable in the field of human relations that Commanders on parallel levels will be inclined to support their own conception as to the way in which they should employ the forces under their command, in giving effect to a combined plan.²⁴

Interestingly, the US Army had the same misgivings about their similar command arrangements for air support. As Lee Kennett has noted, to the Army, "the 'co-equal' principle seemed debilitating".²⁵ In 1943 the US Army had argued that: "The ability to strike one great blow with all available means requires quick decision, accurate timing, and prompt execution; it is the ultimate function of command, not of cooperation."²⁶ At about the same time that Mann was making his post-war accusations, the US Brigadier General T.S. Timberman stated: "As a fundamental military command arrangement, cooperation can be a dangerous thing ... We are afraid of it."²⁷

These accusations were not mere carping after the fact. Indeed, in the midst of some of the worst fighting of the Normandy campaign, Mann had been sufficiently upset to take the time to pen a long memorandum to Lieutenant General H.D.G. Crerar, his Army commander. It is worth

quoting portions of this at length.

The situation as it stands at present makes it quite impossible to expect that there can be any heavy or effective air attacks within a matter of several hours, to say the least, which require resources beyond those within the capacity of the Tactical Group supporting the Army concerned.²⁸

Mann was especially disturbed by a particular air support request which he outlined in great detail. In the end, the RAF had declined to fill it. Mann considered this unacceptable.

It is analogous [the RAF's treatment of his air support request], in my opinion, to a hypothetical case where the CCRA of a Corps [ie the corps artillery commander], having been told by his Commander, or by the Chief of Staff of a Corps, to deliver harassing fire or concentrations at certain places and certain times which are within the capabilities of the artillery:-

- (a) Then queries and argues the necessity of the proposed attacks, and
- (b) Defers taking action whilst awaiting further argument in connection with his own views regarding (a) above, until the opportunity for the attack is either:
 - (i) Passed, or
 - (ii) So closely limited by time factors that the weather and its vagaries will in all probability make it impossible to deliver the attack any way.

In my opinion, the action of the ground forces is sabotaged, rather than supported, by the present practice of the Tactical Group with whom we have been cooperating.²⁹

Only the day after Mann wrote this broadside, a similar incident occurred, serious enough to precipitate formal recriminations back and forth. At 3:45 in the afternoon, 4 Canadian Infantry brigade originated a request for air attack on German tanks in a wood near the village of Mesnil. The request then went through a series of disputes, eventually being cancelled some two and half hours after being requested. Second Canadian Corps headquarters went to the effort of drawing up a detailed chronology of who had told what to whom, from the first request from 4 Brigade at "1545 hrs" to "1810 hrs" when "Army advised receipt of message cancelling attack."³⁰ In fact,

subsequent investigation revealed that aircraft *had* been allocated to the mission, but that the leading aircraft had crashed on take-off, blocking the airfield and ultimately forcing the cancellation of the mission.³¹ Nevertheless, that such an unfortunate incident could spark such bitter recriminations through official channels speaks volumes about the level of trust and confidence between the two services.

The issue of timeliness -- or perhaps more accurately responsiveness-- getting close support air attacks on target as quickly as possible after Army request -- has dominated consideration of the tactical air support issue from the very start. It was the issue that initially drove the Wann-Woodall system for close support and it was the issue that was central to complaints from the Army about air support during the campaign, the most vociferous example being Brigadier Mann's accusations. Indeed, the timeliness issue has dominated the historiography of the issue down to the present day. Many commentators have discussed it, in tones generally disapproving of the RAF.³² Most recently Ian Gooderson, in his analysis of Allied tactical air power, had this to say:

The British system proved very successful in processing pre-planned air-support strikes, but the more difficult test was how quickly air support could be provided in response to impromptu requests from forward troops, where speed was vitally important. In this respect, both in Italy and in the early stages of the campaign in North-West Europe, the process was simply not fast enough.³³

Consideration

Are these accusations that 2nd TAF's air support was uncooperative and stinting, or at least not responsive, justified? First of all, this whole discussion poses an obvious question: just how fast was the response to army requests for air support?³⁴ As we have seen, response time varied

widely, but a comprehensive answer would include:

- Routine pre-arranged missions were generally set out the evening before.
- Impromptu requests varied depending on the priority of the requesting Army unit and circumstances. In the general run of things, a response that was filled from within the Composite Group's own resources (ie a fighter-bomber mission) took an hour or two to fill, if it was decided to fill it.
- If a CABRANK with appropriate forward control was available, the response could be within minutes.

It is not clear that this is such a poor performance. Indeed, in the case of CABRANKs with a VCP or FCP forward, response from the air could be faster than the guns. Admittedly, CABRANKs were the exception rather than the rule, but CABRANKs were an extremely costly means of employing air power.³⁵ Normally, a CABRANK consisted of at least four TYPHOONS, sometimes a whole squadron. Given loiter time, flying time, reloading and refueling time, to keep just one CABRANK filled generally required an entire wing of TYPHOON squadrons. There were only six TYPHOON wings in all of 2nd TAF. So CABRANKs were reserved for when they were really needed -- those comparatively rare cases when *immediate* close support really was essential.³⁶ It was used sparingly, but it was available when necessary.

So what can be said about the Army criticisms of Air Force responsiveness? It would be tempting to conclude straight off that these Army/RAF problems were a hangover from the pre-war inter-service rivalry, which had thoroughly poisoned relations between the two services. At the time, this was certainly the view of the Army in general and Brigadier Mann in particular. Since then, many historians have maintained that the primary motive behind the alleged RAF

intransigence was fear of coming under Army domination, and desire to stress the RAF's independence.³⁷ Indeed, Mann argued that the RAF hierarchy relieved Air Vice Marshal Brown from command of No. 84 Group for being too "subservient" to the army.³⁸

This view would be too simple. It is difficult at best to peer into the minds of men long dead and discern their personal motives. Whatever those motives may have been, personal acrimonies should not be allowed to obscure the fact that there *was* a substantive intellectual dispute. Reflecting a theme that stretched at least back to Slessor's publication of *Air Power and Armies* in 1936, the RAF was genuinely concerned to ensure that its air power was centralized for concerted blows, rather than "penny packeted out" to every army formation along the length of the front. Thus, the RAF preferred not to farm out all of their resources to a CABRANK for every division or corps.

Furthermore, it has to be asked, why would an Army suddenly need air support of a weight "beyond ... the capacity of the Tac[tical] G[rou]p supporting the Army concerned.³⁹"? Presumably only in the event of an unexpected, very large scale, enemy offensive manoeuvre. Does that really describe the requests Brigadier Mann was complaining about? As we shall see in the next chapter, on those occasions when there really was such a sudden great need, 2nd TAF's resources were indeed quickly concentrated.⁴⁰

The debate, then, really hinges on the issue of the desired function for tactical air power. Was it meant to be, in essence, additional fire support for the forward troops, a supplement to the artillery? In that case timeliness of response would be critical. Or was it meant to deny the Germans freedom of manoeuvre and subject them to a grim attrition? Alternatively, the doctrinal intent could have been to disrupt higher level German plans and intentions. In either of the latter

two cases, timeliness of response would be far less critical; indeed in those cases the priority of effort would be far behind the German lines. So what was the intended doctrine?

Air Support Doctrine

As early as March 1943, Air Marshal Barratt, as AOC-in-C Army Cooperation Command, wrote:

It was considered of the greatest importance that air action should be concentrated on objectives vital to the ground operations and this could be achieved by careful selection [of targets] based upon a clear air plan of campaign.⁴¹

Not surprisingly, given RAF attitudes, air support doctrine in 1944, such as it was, stressed the importance of central and independent control of air power, so as to be able to strike at the decisive points. The key doctrinal manual of the time, *Army/Air Operations (1) General Principles and Organization*, stated: "The air effort will be concentrated on a vital target at the decisive point. The tendency to fritter away the effort on relatively unimportant targets must be sternly resisted."⁴²

In the same vein, *Army/Air Operations (2) Direct Support* added:

The temptation to abuse the flexibility of air power by attacking targets that may appear to be favourable, but which in fact are not vital to the battle, must be resisted; otherwise the forces available may be dissipated and not used to the best advantage of the operation as a whole. The maximum effort must be concentrated at the decisive place.⁴³

What is perhaps surprising is that this doctrine had been produced, not by the RAF or the Air Ministry, but by the War Office.⁴⁴ In fact, the principal author and editor of the above two quotations was an Army officer.⁴⁵

Other Army records evince an understanding of this concept. For instance, a document expressing the air support policy for 1st Canadian Army stated that:

Air Support will be employed to full extent available to harass and destroy the enemy on the Army front *in depth behind his forward localities* provided that targets will NOT be engaged by air where they can effectively be engaged by artillery.⁴⁶

The policy goes on to list, in order of priority, five types of targets for air attack: enemy headquarters; bridges; enemy concentrations "of sufficient strength to warrant attack"; enemy logistic facilities, which "will be attacked on a comprehensive plan"; and only lastly enemy guns and defensive works, which "may be engaged subject to the forgoing [limitations]."⁴⁷ In other words, the Canadian Army understood, at least in print, that immediate support of all army troops along the length of the front was not meant to be the primary role of air support.

Indeed, Montgomery himself said much the same thing after Alamein:

Nothing could be more fatal to successful results than to dissipate the air resources into small packets placed under the command of the Army formation commanders with each packet working on its own plan. ... concentrated use of the air striking-force is a battle factor of the first importance.⁴⁸

Viewed this way, the argument about command arrangements for air power rather mirrors the army's own pre-war internal arguments over the correct command grouping for tanks -- concentrated in armoured formations in the fashion of the German panzer divisions, or distributed evenly throughout the army in "infantry support"?⁴⁹ Perhaps an even more direct analogy is to the artillery -- concentrated under a formation level "Commander Corps Royal Artillery" (CCRA) as the Army eventually learned to do, or distributed amongst units on the basis of traditional affiliations?⁵⁰

That being the case, just how did 2nd TAF distribute its air power? Did it attempt to utilize its independence of command to concentrate air power in decisive ways? How long did it actually take to concentrate air power when really necessary? Or, more pertinent to the history of doctrinal development, what did the various schools of thought *think* about those issues? Let us review how,

in fact, 2nd TAF was employed throughout the campaign.

- 1.. John Terraine *The Right of the Line: The Royal Air Force in the European War, 1939-1945* (London: Hodder & Stoughton, 1985), p 607.
- 2.. Post-war RAF narrative, PRO AIR 37/1213, p 84.
- 3.. Quoted in Terraine, *The Right of the Line* p 380.
- 4.. Nigel Hamilton, *Monty: Master of the Battlefield 1942-1944* (London: Hamish Hamilton, 1983). Terraine discusses the same theme, *The Right of the Line*. pp 607-619.
- 5.. The letter was sent to Lieutenant General Bradley commanding 1st US Army, Lieutenant General Dempsey commanding 2nd British Army and Lieutenant General Crerar commanding 1st Canadian Army. Quoted in Carlo D'Este, *Decision in Normandy* (London: William Collins Sons & Co. Ltd., 1983) pp 221-222.
- 6.. Air Marshal Sir Arthur Coningham, post-war report "Operations Carried Out by Second Tactical Air Force Between 6th June 1944 and 9th May 1945", PRO AIR 37/876, p 3.
- 7.. Terraine, *The Right of the Line*, p 387.
- 8.. D'Este, *Decision in Normandy*, p 218.
- 9.. Alanbrooke Papers, quoted *ibid*, p 218.
- 10.. For Montgomery's side of the story, see in particular Hamilton *Monty: Master of the Battlefield 1942-1944*, which has many highly uncomplimentary things to say about Coningham. In his post-war report on the campaign, cited in note six above, Coningham gives full vent to all of his criticisms of Montgomery. Probably partly because of its scathingly critical nature, this report remains unpublished. A more balanced presentation of Coningham's side of the story is presented in Terraine *The Right of the Line*, pp 637-658.
- 11.. See, for instance, Lord Tedder, *With Prejudice*, (London: Cassell, 1966), pp 571-572.
- 12.. D'Este, *Decision In Normandy*, p 79.
- 13.. Montgomery's justification for this was that in his capacity as (acting) overall ground forces commander he could deal with Leigh-Mallory as an equal, and in his capacity as GOC 21st Army Group, he could deal directly with Broadhurst, whose headquarters was temporarily controlling all of the aircraft of both Nos. 83 and 84 Groups. Terraine, *The Right of the Line*, p 610.
- 14.. D'Este, *Decision In Normandy*, p 219. See also, Hamilton *Monty: Master of the Battlefield*, p 759.

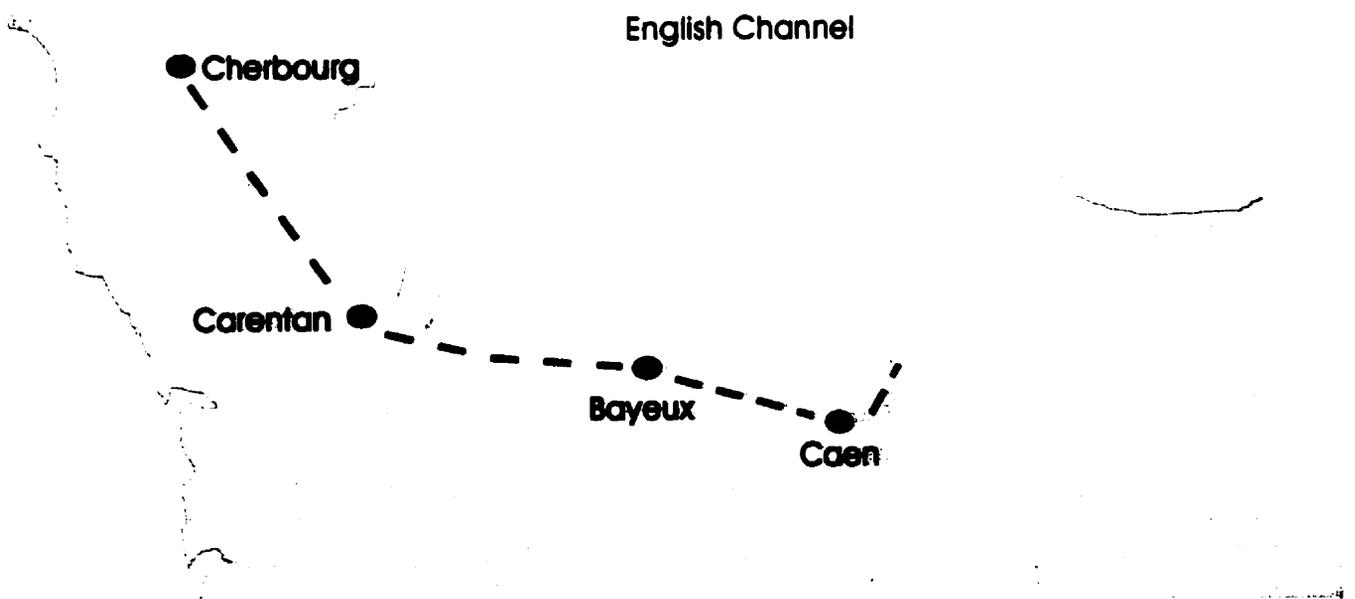
- 15.. Air Marshal Coningham, letter to Air Vice Marshal J. Breen, Air Ministry, (30 August 1944, PRO AIR 37/2).
- 16.. Tedder never came out and voiced disapproval of Coningham the way he did of Leigh-Mallory. However, he clearly found Coningham a difficult subordinate. See for instance *With Prejudice*, pp 552-553.
- 17.. Tedder, *With Prejudice*, p 564.
- 18.. Diary of Sir Trafford Leigh-Mallory, quoted in Hamilton, *Monty: Master of the Battlefield*, p 731.
- 19.. See for instance *ibid*, p 738. As a charter member of the Montgomery camp, Hamilton describes Tedder's actions as "one of the most reprehensible performances by a senior Allied commander."
- 20.. Ian Gooderson *Air Power at the Battlefield: Allied Close Air Support in Europe 1943-45* (London: Frank Cass, 1998), pp 149-154.
- 21.. Chief of Staff First Canadian Army, Message to 21 Army Group dated 19 July 1944, NAC RG 27, Vol 10671, File 215C1.093(D2)
- 22.. *Ibid*. Capital letters in original.
- 23.. Major-General C.C. Mann "An Analysis of the System for Direct Air Support in the Northwest Europe Campaign" NAC RG 24 Vol 10671 file 215C1.091, p 4.
- 24.. *Ibid*.
- 25.. Lee Kennett "The US Army Air Forces and Tactical Air War in the Second World War" in *The Conduct of the Air War in the Second World War* ed by Horst Boog (Oxford: Berg Publishers, 1992) p 462.
- 26.. War Department, Military Intelligence Service, *Notes and Lessons on Operations in the Middle East*, Washington, 30 January 1943, p 24. Cited *ibid*, p 462.
- 27.. Brigadier General T.S. Timberman "Tactical Air Requirements of the Army" Speech to the Air War College, Maxwell AFB AB, 26 May 1949, cited *ibid* p 462.
- 28.. Brigadier C.C. Mann, Chief of Staff 1st Canadian Army Headquarters, Memo "Requests for Air Sp" 11 August 1944, DHH 958C.009(D72)

- 29.. Ibid.
- 30.. Main Headquarters, 2nd Canadian Corps, "Air Attack requested by 4 Cdn Inf Bde 12 Aug 44", 13 August 1944, NAC RG 27 Vol 10671 File 215C1 093(D2).
- 31.. Main Headquarters, 1st Canadian Army, "Air Sp Request by 4 Cdn Inf Bde 12 Aug 44", 22 August 1944. NAC RG 27, Vol 10,671, File 215C1 093(D2).
- 32.. See for instance Max Hastings, *Overlord* (London: Pan, 1984) pp 267 & 270; Shelford Bidwell, and Dominick Graham, *Fire-Power: British Army Weapons and Theories of War 1904-1945* (London: Allen and Unwin, 1982), p 250; and Nigel Hamilton, *Monty, Volume 2 Master of the Battlefield 1942-1944* (London: Hamish Hamilton, 1986), pp 620-622 & pp 692-693, which includes some especially vituperative comments against Air Marshal Coningham. Even air historians have commented upon the difficulties of timeliness, for instance W.A. Jacobs "The Battle for France, 1944" pp 260 & 272.
- 33.. Gooderson, *Air Power at the Battlefield*, p 27.
- 34.. Significantly, in the passage cited at note 33 above, Gooderson does not answer this question.
- 35.. See AHB, *Air Support, The Second World War 1939-1945: Royal Air Force* (Air Ministry: Air Publication 3235, 1955, originally a classified report), p 149 for an examination of this issue. Also, Gooderson, *Air Power at the Battlefield*, p 239.
- 36.. Terraine, *The Right of the Line*, p 637.
- 37.. See for example Hamilton, *Monty: Master of the Battlefield*, pp 620-622.
- 38.. Mann, *Analysis of the System for Direct Air Support*, p 6. In this, at least, Mann would appear to be correct, see note 15 above.
- 39.. Brigadier C.C. Mann, "Requests for Air Sp" 11 August 1944, DHH 958C.009(D72)
- 40.. For instance, the German Operation LÜTTICH at Mortain. See Chapter four below.
- 41.. Air Marshal Barratt, March 1943, writing in his report after Exercise SPARTAN, one of the first exercises in the UK practicing large scale army/tactical air force manoeuvres. Quoted in Terraine, *The Right of the Line*, p 563.
- 42.. WO, *Army/Air Operations (1) General Principles and Organization*, (26/GS Publications/1127), 1944, p. 8.

- 43.. WO, *Army/Air Operations Pamphlet No. 2 Direct Support*, (26/GS Publications/1181), 1944, p 12.
- 44.. That is to say, it had been produced by the government department responsible for the Army.
- 45.. Lieutenant Colonel Charles E. Carrington.
- 46.. "First Canadian Army Air Support Instruction Number 1" 2 August 1944, DHH file 958C.009(D72)
- 47.. Ibid.
- 48.. Quoted in John Slessor, *The Central Blue*, (New York: Frederick A. Praeger, 1957), p 421.
- 49.. There is a vast literature on this famous debate. See in particular: Brian Bond, *British Military Policy Between the Two World Wars* (Oxford: Clarendon Press, 1980); Robert H. Larson, *The British Army and the Theory of Armored Warfare, 1918-1940* (Newark: University of Delaware Press, 1984); Jay Luvaas, *The Education of an Army: British Military Thought, 1815-1940*, (Chicago: University of Chicago Press, 1964); and Harold Winton, *To Change an Army: General Sir John Burnett-Stuart and British Armoured Doctrine, 1927-1938* (Lawrence, Kansas: University Press of Kansas, 1988).
- 50.. Bidwell and Graham, *Fire-Power*, pp 248-259.

CHAPTER FOUR: OPERATIONAL HISTORY

The history of the Normandy landings and the subsequent campaign is well known.¹ Suffice it to say that after considerable strategic debate, the Anglo-American leadership finally resolved to dedicate maximum effort to a direct attack upon Nazi-held Europe. However, after the initial assault over the beaches -- which with only one exception proved far less costly and difficult than feared -- the campaign quickly bogged down. Air support came to be ever more heavily relied upon to break the stalemate, with even the heavy bombers eventually used in a close support role. Air power was also significant in halting the only major German counter-offensive of the campaign, around Mortain. Eventually, the German line collapsed, and the bulk of the German 7th Army was destroyed in the rout from the Falaise pocket, a rout in which air power played a prominent part in harrying the Germans.



Map 1: Operation OVERLORD initial objectives/

The invasion, for which the overall code name was OVERLORD, began with an amphibious landing on the Normandy coast. This phase was known as Operation NEPTUNE, and the initial objective was "to secure a lodgement area along the general line CAEN-BAYEUX-CARENTAN-CHERBOURG."² By June 1944 the Anglo-American forces had already fought and won the battle for control of western Europe's skies. This came largely as a consequence of the strategic bombing offensive against Germany, which had exhausted the once mighty Luftwaffe, but come D-Day the tactical air forces benefited in full measure.³ That fact was not, however, fully appreciated at the time. Or at least, it was not taken for granted; the initial Allied concern with air planning for D-Day lay primarily with air defence. The "Over All Air Plan" for NEPTUNE listed, in order of priority, six principal air tasks for the assault phase⁴:

- 1) Air superiority;
- 2) Reconnaissance;
- 3) Disrupting enemy lines of communication;
- 4) Supporting Army troops;
- 5) Attacking any enemy naval threats; and
- 6) Airlift of airborne forces.

Reflecting these priorities, the planning for D-Day allocated considerable force to the air superiority role. From 0430 hours on D-Day, no less than 10 fighter squadrons maintained continuous beach cover at all times; a further six squadrons patrolled continuously over the shipping lanes in the Channel.⁵ For the Allied Expeditionary Air Forces overall, the squadrons were allocated⁶:

Beach Cover	54 Squadrons
Channel Cover	15 Squadrons
Direct Air Support	36 Squadrons
Offensive Air Support	33 Squadrons
Escort to Airborne Operations	33 Squadrons

The fighter squadrons tasked with channel and beach cover were ordered to remain in circuits at their assigned stations rather than to range inland, even in the absence of any German

opposition.⁷ Generally speaking, there was no opposition from the Luftwaffe, which had only 319 aircraft available to face the over eleven thousand the Allies could muster.⁸ The Operations Record Book of one of 2nd TAF's Spitfire squadrons recorded of D-Day that:

We were doomed to disappointment as far as enemy aircraft opposition went. The squadron carried out four patrols between dawn and dusk and not a thing was sighted in the air except apparent thousands of Allied aircraft all making their way towards Hitler's European Fortress. Returning pilots report that the Channel seems to be full of sea going craft of all shapes and sizes.⁹

Obviously none of the elaborate 2nd TAF control machinery, described in chapter two above, was initially available on the shore. So at first the aircraft were controlled from ships in the channel. Staff teams from headquarters 2nd TAF and No. 83 Group were placed on the various command ships, and several "Fighter Direction Tenders" were fitted out to fulfill the role of the GCCs.¹⁰ Coningham and the main body of 2nd TAF's headquarters were located at the "Combined Control Centre", located at Uxbridge so as to utilize the elaborate but static RAF command and control facilities there.¹¹ However, no time was wasted getting 2nd TAF's control machinery ashore; 483 GCC from No. 83 Group was actually landed and operating by nightfall 6 June.¹²

With the essentially defensive role of the vast fighter umbrella absorbing the better part of the two composite groups' resources, most of 2nd TAF's interdiction effort fell to the medium bombers of No. 2 Group. To quote the No. 2 Group operations order for D-Day:

Intention: To cause maximum delay to the movement by road and rail by enemy forces at night in the area prescribed.

General Plan: All Mitchell and Mosquito squadrons in the Group will be used, throughout the hours of darkness, to delay enemy road movements in the following inclusive areas: Lessay-Caen-Lisieux-Argentan-Domfort-Fougères-Avranches.¹³

Many of these missions were planned ahead of time, but some were also impromptu. For instance, on 11 June the Army requested an attack upon a concentration of fuel tankers in the rail

yard at Châtellerault. Nine Mosquitos were dispatched and struck the target at about ten thirty in the evening that same day.¹⁴ In general, No. 2 Group spent the first nights of the campaign flying missions against rail and road choke points across the Normandy area.¹⁵

After the initial assault phase had successfully consolidated a lodgement, the overall air plan envisioned a change in the priorities to five air tasks¹⁶:

- 1) Air superiority;
- 2) Delaying the arrival of enemy reserves and reinforcements;
- 3) Direct support to Army troops;
- 4) Airlift for airborne operations; and
- 5) Other air transport.

The Overall Air Plan also noted, however, that "A task of major importance will be continual air attacks against key points in the enemy's rail communications leading into the lodgement area ... [and that] enemy road movements ... will be continually harassed."¹⁷ In large part this responsibility fell to the medium bombers of No. 2 Group, who nightly attacked bridges, road and rail choke points, across the whole front.

Closer to the front, the fighter-bombers of the composite groups concentrated upon interdicting German panzer forces in the immediate battle zone. Undoubtedly, their most famous success was the story of the Panzer Lehr division's journey forward on 7 June. Attempting to move from the Chartres area to the Seullès Valley to block XXX Corps' thrust towards Villers-Bocage, losses to air attack cost Panzer Lehr more than 130 trucks and fuel tankers, five tanks, and 84 self-propelled guns, half-tracks, and prime movers.¹⁸

Carlo D'Este described Panzer Lehr's losses to air attack on 7 June as "typical", but this is not so. In fact, as early as 8 June the Air Commander-in-Chief himself, Air Chief Marshal Leigh-Mallory, admitted that his plan to prevent the movement forward of the immediate German reserves

had failed. According to the minutes of the Allied Air Commanders' Conference of 8 June:

... the Air Commander-in-Chief, giving an appreciation of the situation, admitted that the plan to hinder initial moves of enemy reserve divisions by the creation of choke points had failed owing to bad weather. The move of [German] immediate reserves into the tactical area was almost complete.¹⁹

Another incident early in the campaign did demonstrate, however, how quickly and effectively 2nd TAF's air power could be concentrated. On the evening of 9 June, ULTRA decrypts of German communications pinpointed the headquarters of Panzer Group West at La Caine chateau by Thury-Harcourt, some 20 kilometres south of Caen.²⁰ This headquarters, under the command of General von Schweppenberg, was being watched closely by Allied intelligence, for it had been held at Paris to move forward to assume command of all available panzer forces for a decisive German counter-attack against the Allied landing, where ever that should come. A quick air reconnaissance revealed the signals trucks and office caravans of the headquarters parked in an orchard, unprotected and uncamouflaged. Second TAF quickly mounted a maximum effort strike and on 10 June a total 40 Typhoons from No. 83 Group, and then 61 Mitchells from No. 2 Group, attacked the target.²¹ The German headquarters was devastated, eighteen staff officers were killed outright, including the chief of staff, and von Schweppenburg himself was badly injured. The headquarters was so badly shattered that its remains were withdrawn to Paris.²²

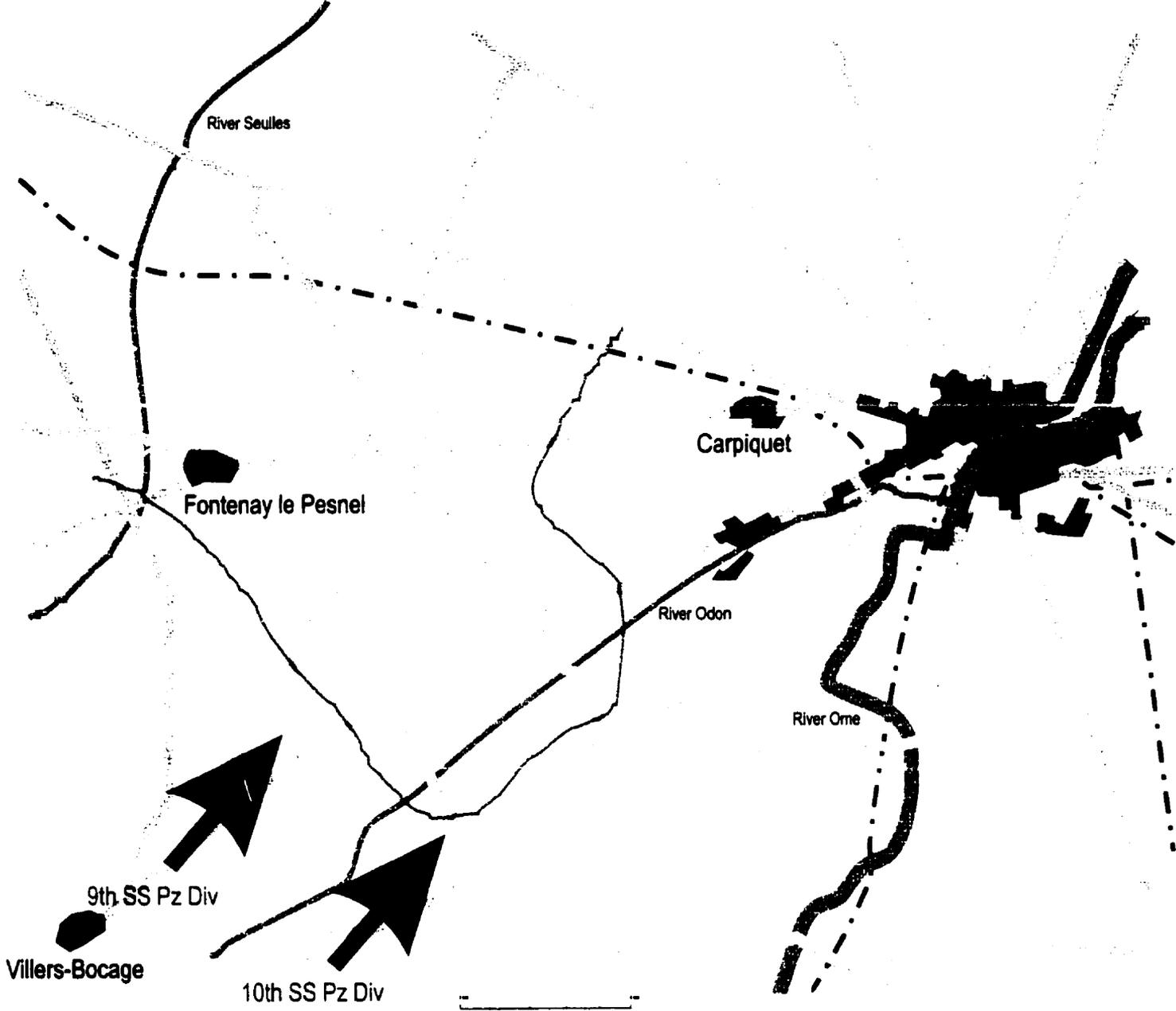
Having beaten off the immediate German counter-attacks, the five beaches were consolidated into one beachhead within a week, and 2nd TAF wasted no time in getting as many as possible of its elements established on shore. On 7 June, the first servicing commandos and construction wings had landed and begun the construction of airfields in the still fledgling beachhead.²³ Work proceeded despite German shelling, and two days later the first RAF aircraft since 1940 landed on a continental airfield.²⁴ They did not stay, however, remaining only long

enough to refuel and return to their UK bases.²⁵ By 30 June 11 airfields had been hewn out of the Norman soil, with work begun on a further two.²⁶ However, because it took ten airfields to house each composite group, only No. 83 Group could be quickly moved to the continent.²⁷ No. 84 Group remained stuck operating from UK based stations for some time.

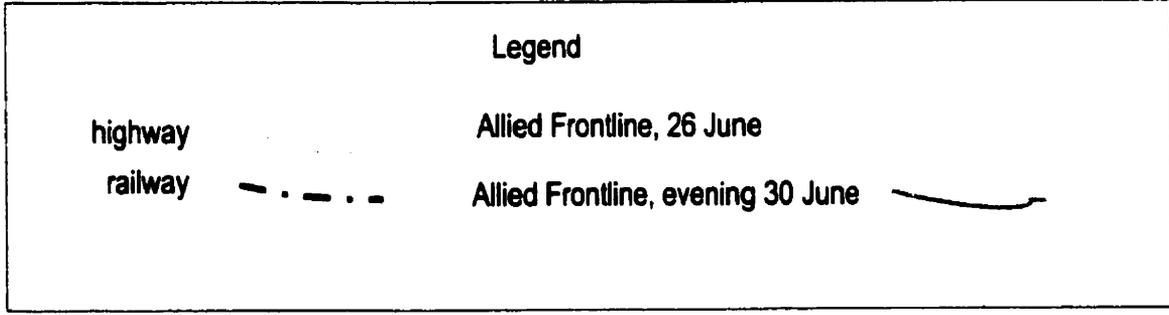
Despite the initial success at establishing the beachhead the campaign quickly bogged down, many first day objectives still in German hands after several weeks of bitter fighting.²⁸ But German ambitions too had been frustrated. Initially, Rommel wanted an immediate counter-attack with a decisive concentration of panzer divisions. However, he could not do so -- in part because of the destruction of headquarters Panzer Group West on 10 June -- and the pressure of the Allied attacks forced him to commit his armour piecemeal just to hold the line. Another week of hard fighting found the Anglo-American armies still bottled up and, in many cases, still short of their initial objectives for D-Day itself.

Operation EPSOM, 26 June

The most infamous of those still uncaptured D-Day objectives was Caen, stubbornly defended by elements of six panzer divisions. In these circumstances, General Montgomery, commanding 21st Army Group, launched Operation EPSOM on 26 June, with the intent of driving past Caen on the west flank. Chronically bad weather plagued EPSOM, effectively preventing the participation of all aircraft based in Britain.²⁹ This forced the cancellation of what would have been the first use of heavy bombers in a tactical role, it having been planned to use Bomber Command to strike around Villers-Bocage on the night of 25/26 June to protect the offensive's flanks. Despite the bad



source: Ellis, *The Battle of Normandy*, p 286.



Map 2: Operation EPSOM, 26 June.

weather, on 26 June No. 83 Group, now working from hurriedly improvised airfields on the continent itself, managed to fly 114 armed recce, 97 dive bombing and 21 Tac/R sorties in the battle area.³⁰ The ground fighting was bitter, the German defenders resisting strongly. Nevertheless, on 27 June No. 83 Group's fighter-bombers succeeded in striking a German headquarters and concentration of panzers at Carpiquet airfield.³¹

The Germans' responded to EPSOM with one of their largest armoured counter-attacks of the campaign. On 29 June 9th and 10th SS Panzer Divisions attacked into EPSOM's western flank, which prompted 2nd British Army to call on No. 83 Group to attack leading elements of the concentrating German armour.³² SS General Hausser later related how the panzers' counter-attack "was scheduled to begin at seven o'clock in the morning but hardly had the tanks assembled when they were attacked by fighter-bombers. This disrupted the troops so much that the attack did not start again till two-thirty in the afternoon."³³

Finally, on 30 June the weather improved, and for the first time Bomber Command's heavy bombers were used for direct intervention in the battle, a technique that would later become controversial. At 2000 hours on 30 June, 1,100 tons of bombs were dropped in daylight on a concentration of German armour assembling by Villers-Bocage.³⁴

In part because of these air actions, the panzers' attacks failed to punch through the British lines, although their efforts did bring EPSOM to a halt. The operation was broken off on 1 July, and 21st Army Group licked its wounds for the next week. The Germans, meanwhile, began to reorganize their defences in the hopes of extracting the precious panzer formations from the line to form a mobile reserve.³⁵ For a time, therefore, the front moved very little, and 2nd TAF's operations concentrated upon attempts to interdict the German troop shuffling.³⁶

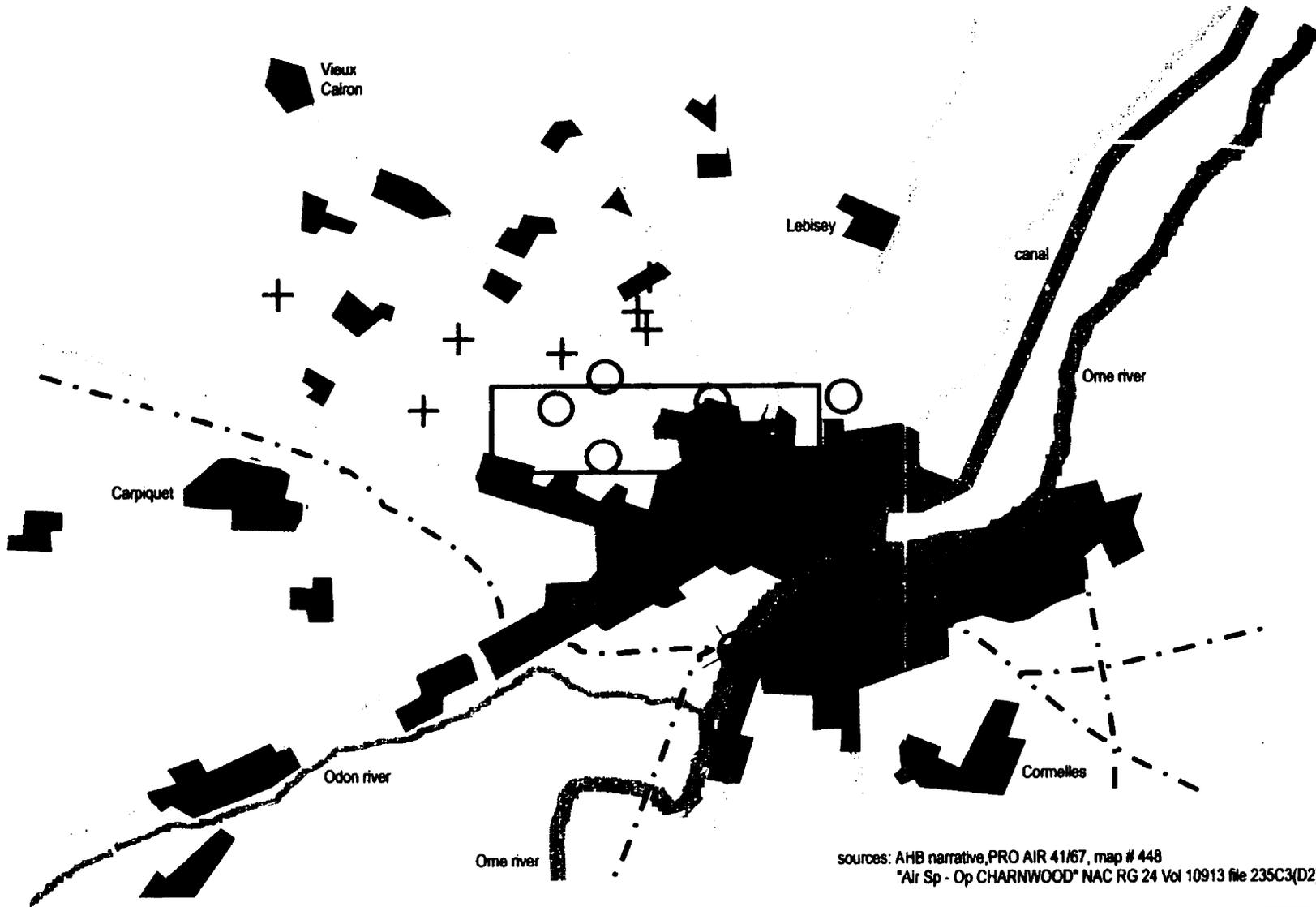
Operation CHARNWOOD, 8 July

The next big effort was Operation CHARNWOOD, another drive on Caen. The full gamut of air support was laid on, from the fighter-bombers of the Composite groups and No. 2 Group's medium bombers, to heavy support from Bomber Command. The air plan called for 2nd TAF's own resources to attack German positions just in front of the attacking troops as the actual offensive kicked off, while the heavies from Bomber Command would strike the leading edges of Caen itself the day before.³⁷ On the late evening of 7 July 467 heavy bombers attacked under ideal conditions, devastating the target box with 2,300 tons of bombs.³⁸ In open ground within the box, the craters were practically contiguous; with only one exception all roads to Caen through the target area were completely blocked.³⁹

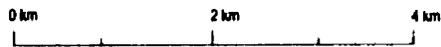
The heavies' strike on Caen remains controversial to this day. While Caen was certainly heavily damaged, very probably the German defences of the area were not.⁴⁰ The British scientific advisor Solly Zuckerman and Air Commodore Kingston-McCloughry concluded in their special report that "the bombing had made no material difference to the whole operation ... [and] not a single dead German or any enemy equipment had been found in the area that had been bombed."⁴¹

From early morning on 8 July, fighter-bombers from No. 83 Group were operating almost continuously, 766 sorties being flown from bases within the beach-head.⁴² After much hard fighting, CHARNWOOD did succeed. All of Caen north of the Odon fell into Allied hands on 9 July, although the German remnants succeeded in establishing themselves in defensive positions on the south bank.

Map 3: Operation CHARNWOOD, 18 July.



sources: AHB narrative, PRO AIR 41/67, map # 448
 "Air Sp - Op CHARNWOOD" NAC RG 24 Vol 10913 file 235C3(D2)

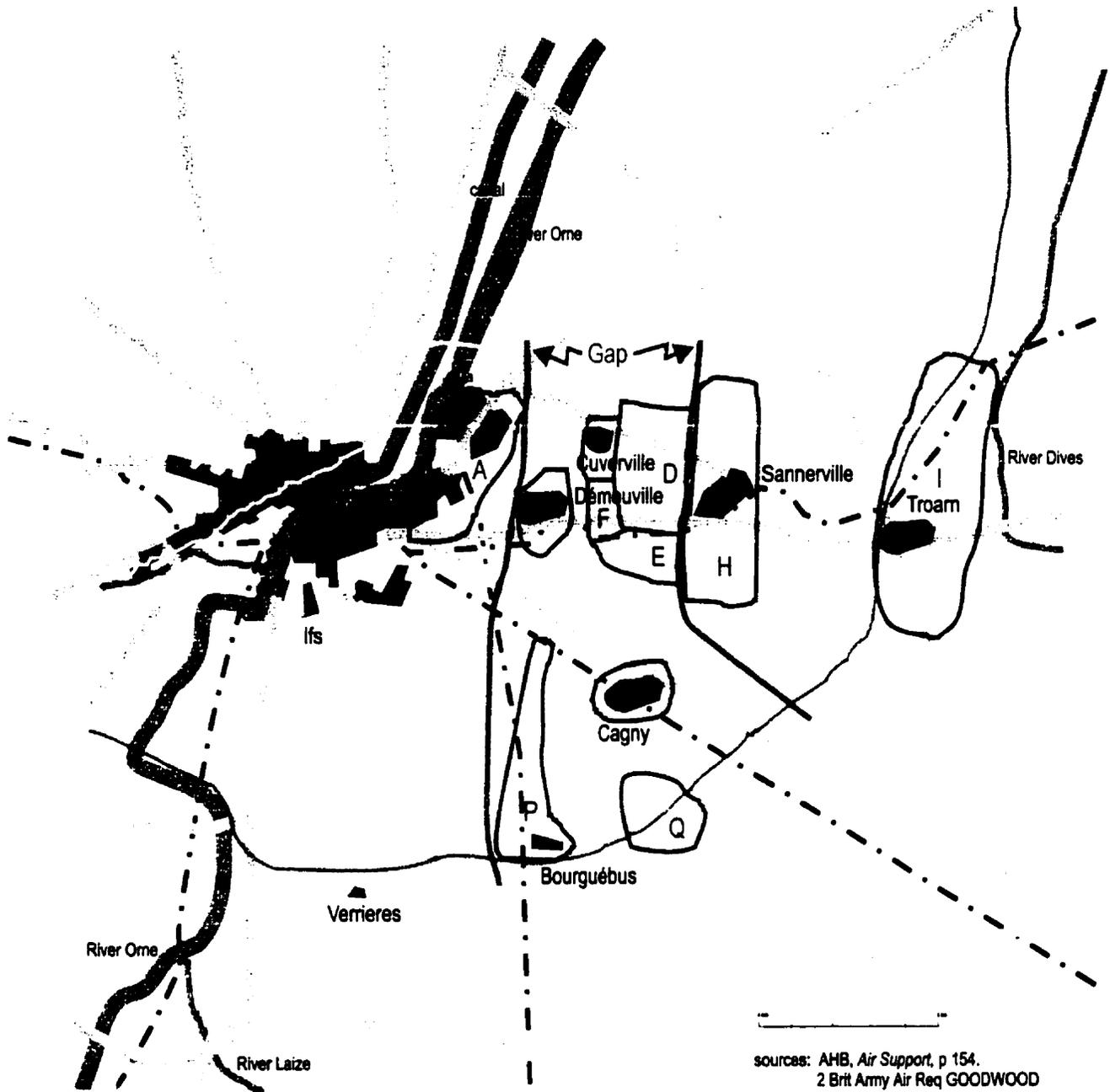


Legend	
highway	Heavy bomber target area
railway	Medium bomber aiming points
Allied Frontline, 8 July	Fighter-bomber targets

GOODWOOD/ATLANTIC, 18 July

After another week of build-up, the same formula was repeated east of Caen, this time in an operation known as GOODWOOD. GOODWOOD was novel in various ways, not least because the main effort was made with armour. Three British divisions, 7th Armoured, 11th Armoured, and the Guards Armoured, were to punch through the German lines east of Caen and then push south onto Bourguébus ridge. Montgomery's hope has been variously described as to achieve a strategic breakthrough, to "write down" the German panzer forces and prevent them from moving west to the US sector, or simply to generally exhaust the Germans.⁴³

Regardless, by this time respect for German defensive abilities ran high within 21st Army Group, and given the strong panzer and anti-tank forces in the area, Montgomery envisioned a difficult fight. The problem was not just to "break in" to the German defences -- which were in depth -- but to break all of the way through them. Army planners saw fire support as the key to suppressing the mortar and anti-tank fire upon which the German defence was based, and air power was to be the means of maintaining fire support as the advance outran the artillery's range.⁴⁴ Thus, air power was crucial, and Montgomery decided that if bad weather precluded air support on the planned D-Day (18 July), the entire operation would be delayed.⁴⁵ The plan tasked Bomber Command to provide intimate support "by similar methods as those employed for the attack on CAEN" by the "destruction" of a cluster of villages south east of Caen.⁴⁶



Legend	
highway	Allied Frontline, morning 18 July
railway	Allied Frontline, evening 20 July
air target areas	Flanks of corridor of British armoured advance

Map 4: Operation GOODWOOD, 18 July.

The British armour was to push through what was called "the gap" between the outskirts of Caen and Sannerville, and down the corridor of comparatively flat and open ground east and south east of Caen. The corridor's flanks were to be sealed off by massive air strikes from heavy bombers, hence target areas A and H were assigned to Bomber Command. The only target in the corridor itself that was struck by the heavies was Cagny, target area M. Other than Cagny, the German forward defences within the corridor area were to be "neutralized" without heavy cratering, and therefore target areas C, D, E, and F were assigned to the medium bombers of the US IXth Air Force.⁴⁷

Second TAF's own assets were concentrated upon even closer support for the Army, No. 83 Group being given three main functions:

- 1) to recce "closely" the area ahead of the Allied troops;
- 2) to destroy a variety of pre-arranged targets, mostly concentrated south of the CAEN-VIMONT road [ie on Bourgébus ridge]; and
- 3) to destroy certain bridges over the ORNE and DIVES rivers [to hamper any move forward by German reserves].⁴⁸

In the event, 18 July dawned unusually bright and clear, and at 0535 hours, 1056 Lancasters and Halifaxes from Bomber Command began dropping over 5,500 tons of bombs on targets A and H.⁴⁹ At 0615 a smaller force of about 100 bombers struck Cagny, and at 0700 415 Mauraders and Bostons from the US IXth Air Force came in on their targets.⁵⁰

Montgomery's chief of staff, Major General De Guingand, recalled watching the bombers:

I drove out with Air Marshal Coningham to see the bombers attack. It was a perfect opal summer morning ... Before long we could hear a drone, and almost immediately the northern and eastern skies were full of aircraft. It looked just like a swarm of bees homing upon their hive ... One appreciated the bravery of those pilots and crews as they flew straight into the most ghastly looking flak. Every now and then an aircraft would burst into flames.⁵¹

The ground advance began at 0745, with Second TAF's fighter-bombers in close support. Overall, 2nd TAF flew 1,289 sorties on 18 July.⁵² Typhoons flew most of the close support that day, putting up 468 sorties, 306 in pre-arranged strikes against German gun positions, strong points and several bridges, the balance on impromptu missions.⁵³ By 1030 hours only two impromptu calls for air support had been received, but thereafter the rate picked-up as the battle intensified; 162 impromptu sorties were eventually dispatched.⁵⁴

For the first time, some of those impromptu missions were being controlled by Visual Control Posts (VCPs). A Sherman command tank fitted out as a VCP was sent forward with the 29th Armoured Brigade of 11 Armoured Division.⁵⁵ Unfortunately, the RAF controller was wounded early in the battle, but the young Air Liaison Officer, Second Lieutenant P.M. Roberts, carried on and successfully directed aircraft onto several targets, including a concentration of panzers in Bourgébus wood, and some German tanks in Bourgébus village itself.⁵⁶

Despite all of this battle power, both land and air, the German defence was strong and skillful. The British armoured columns were disrupted and broken up by German tank and anti-tank fire. In particular, a German gun line, based upon Bourgébus ridge, exacted a heavy toll. By the end of the first day the British had lost some 180 tanks, and reached no farther than the general line of the Caen-Cagny rail line.⁵⁷ The next day poor weather compromised 2nd TAF support, and on 20 July Montgomery called the offensive off, having dented the German lines by only some 12 kilometres. The British official history maintains that the essential aim of tying down and weakening the German armour was attained, which is certainly true, but the advance produced heavy casualties and failed to capture much ground.⁵⁸

SPRING/COBRA, 25 July

Just before the next effort came, headquarters 1st Canadian Army finally became operational on the continent, assuming responsibility for part of the line on 23 July. Unfortunately, because of the acute airfield shortage in the crowded beach-head, most of No. 84 Group remained in England. As a result, headquarters 1st Canadian Army began operations with only an advanced element of the No. 84 Group's operations cell, rather than with the full headquarters of its paired composite group co-located.⁵⁹

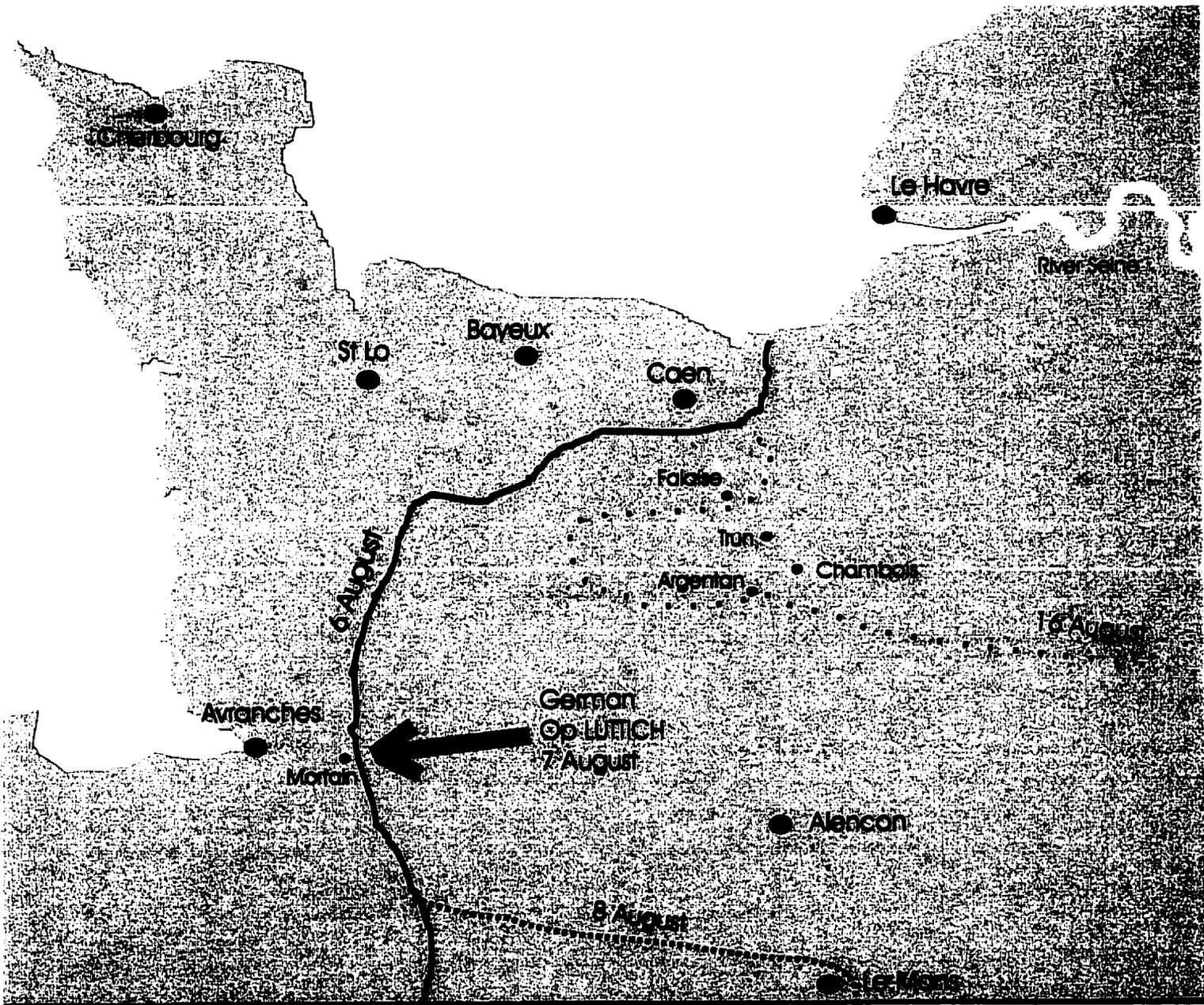
Two days later, Operation SPRING was launched, picking up where GOODWOOD had left off. Once again the plan was to attack the German defences south and south east of Caen. The Germans were expecting further efforts along this line, however, and on 22 July 2nd Panzer Division moved to the area of Tournebu, some 20 kilometres due south of Caen.⁶⁰ Also, the 9th and 10th SS Panzer divisions were ordered to assemble just west of Brettville sur-Laize.⁶¹

This time, no heavy bombers were called in, and the air programme for the offensive opened with the declaration that "the air aspect of operation SPRING is in the form of a bonus and will only be undertaken if suitable weather conditions prevail."⁶² The preliminary attack by medium bombers from No. 2 Group on 24 July was largely ineffective because of heavy anti-aircraft fire; only 15 out of 60 aircraft succeeded in bombing the target.⁶³ The ground operation itself kicked-off at 03:30 in the morning on 25 July, quickly meeting disaster, 2nd Canadian Infantry Division's attack on Verrières Ridge in particular going badly. The infantry were caught in open wheat fields by strong German forces, and counter-attacked by panzers. Close air support was

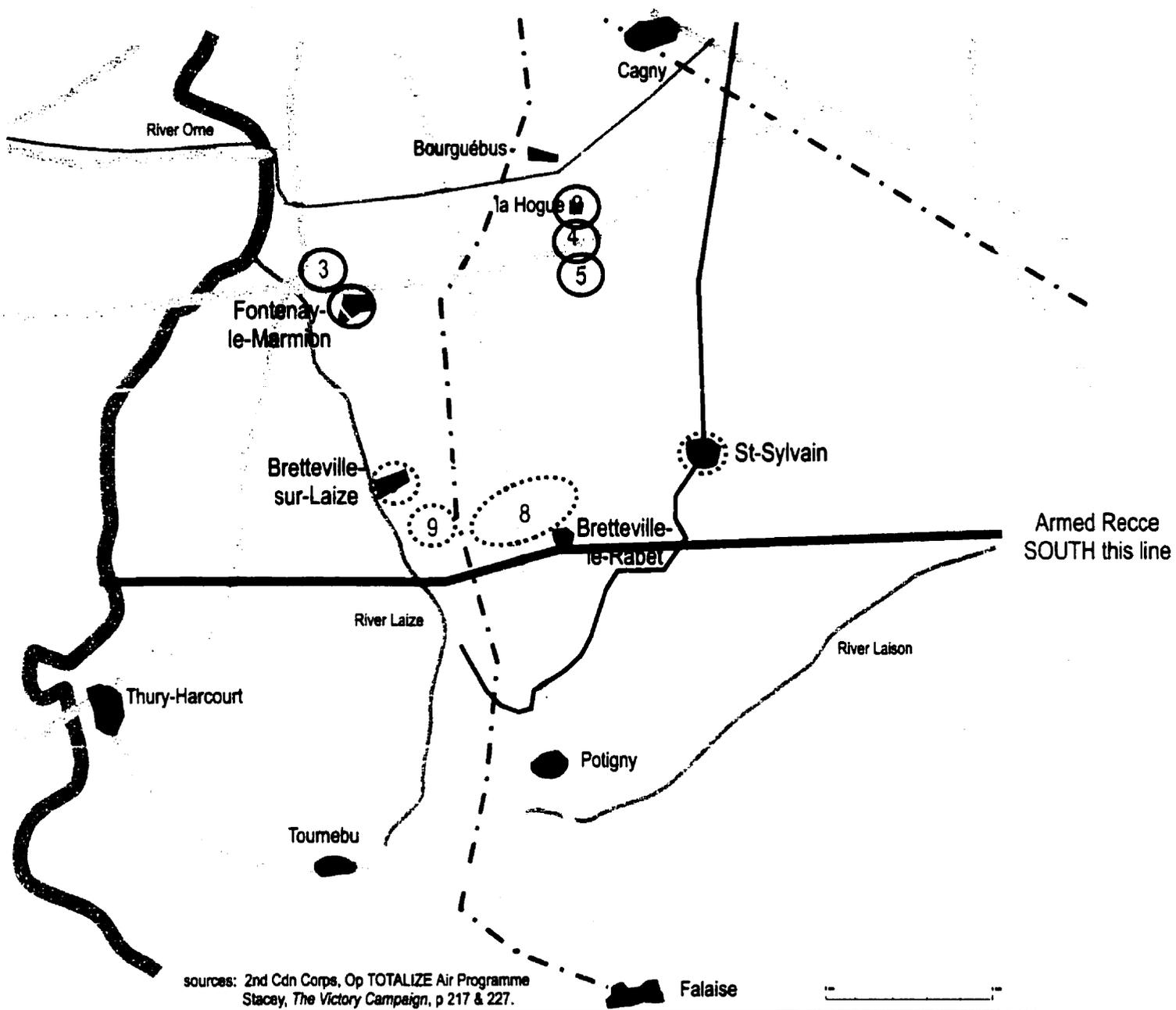
called in to help stabilize the situation, rocket firing Typhoons from 181 and 182 squadrons of No. 83 Group making a major attack on German armour along the ridge between 6:40 and 7:40 in the evening of 25 July.⁶⁴ Despite these efforts, in the words of the Canadian Army's official historian, the operation had "struck a stone wall."

On the same day that Canadian troops were mounting SPRING, US troops in the western sector unleashed Operation COBRA, which eventually led to their break-out on that flank. Five days later, after SPRING had petered out, 2nd British Army launched Operation BLUECOAT, to the east of Caen, in an effort to keep the pressure up on the German defences while the US Armies exploited their breakthrough. Neither of these efforts by 21st Army Group gained much ground, although they did unquestionably tie down and exhaust the main weight of the Germans' panzer forces.⁶⁵ The American 12th Army Group, meanwhile, with General Patton's 3rd Army now ashore, began a mad two week drive south and then east in a wide hook that by 8 August had brought them to Le Mans.

At about this time command arrangements, always contentious, were adjusted again. Montgomery's main headquarters crossed to France and on 4 August established operations at le Tronquay, some ten kilometres south-west of Bayeux. Accordingly, Broadhurst relinquished his temporary appointment as Commander, Advanced Allied Expeditionary Air Force, and Air Marshal Coningham set-up his headquarters as Commander 2nd TAF adjacent to Montgomery, who for the time being remained overall Allied ground forces commander. No. 84 Group established an advanced headquarters on the continent on 6 August, but did not become fully operational until 12 August.⁶⁶



Map 5: Allied Breakout, 25 July – 8 August.



sources: 2nd Cdn Corps, Op TOTALIZE Air Programme
 Stacey, *The Victory Campaign*, p 217 & 227.

Legend	
Hy Bomber targets, ph 1	○
Hy Bomber targets, ph 2	⊘
railway	- . - . - .
Allied Frontline, evening 7 August	—
Allied Frontline, evening 8 August	- - -
Allied Frontline, evening 10 August	—
highway	—

Map 6: Operation TOTALIZE, 7 August.

Throughout all of this, No. 2 Group remained primarily dedicated to reducing German movement to the battle area. On the night of 27-28 July the group made a maximum effort, flying against more than a dozen targets, including German concentrations around Bretteville south of Caen, but with most of their sorties devoted to transportation targets ranging as far afield as Dijon, some 200 kilometres south east of Paris.⁶⁷

TOTALIZE, 7 August

The long-awaited break-out produced an atmosphere verging on euphoria in at least some of the senior headquarters⁶⁸, and planning began for the next big push from 21st Army Group. This was Operation TOTALIZE, an effort to break through the fraying German line south of Caen, this time decisively. Leading the attack would be 2nd Canadian Corps.

TOTALIZE was conceived as heavily dependent on air power. A consideration written as part of the planning process noted:

6. In essence, the problem is one of getting armour through enemy gun screens to sufficient depth to disrupt his anti-tank guns and mortar defence, in country suitable to the tactics of the latter combination.

7. The *essential conditions* of this operation may therefore be summarized as follows:

(a) the provision of *overwhelming air support* both by night and by day until completion of the break-through, and

(b) ... suitable weather to ensure the full effectiveness of such *overwhelming air support*.⁶⁹

Once again, heavy bombers were brought in to provide close support, along with 2nd TAF's own resources. The role of the fighter-bombers of Nos. 83 and 84 Groups was to be "mainly against opportunity targets as they arise during the day's operations; particular attention being paid

to the 12 Pz Div area on the left flank of the main attack."⁷⁰

The ground forces spent the afternoon of 7 August forming themselves up, and executing a short temporary withdrawal so as to be well clear of the way of the heavy bombers' attack to come. That evening, just before 2300 hours, 1020 bombers from Bomber Command thundered overhead in the last light of the day and dropped 3462 tons of bombs on the villages along the flanks of the planned attack.⁷¹ These were targets 1 to 5, and the high explosive bombs were fuzed so as to crater the ground, in order to impede the movement of any German forces that might try to counter-attack into the flanks of the offensive.⁷² The ground advance began at 2330 hours, just as the last bombs were falling on the most distant target. There followed a night of confused and clumsy fighting. Nevertheless, by first light the Canadians had essentially broken through the German line.⁷³ However, rather than exploiting the breakthrough they halted to protect the start-line for the next phase of the operation, and to await another heavy bomber strike, this time from the Americans. It would take some six hours to arrive, and the Germans used the breathing space to rush in reinforcements and seal the break. In the meantime, No. 83 Group's fighter bombers were assigned to armed recce south of a line running through Bretteville-le-Rabet, in an effort to prevent just such movement.⁷⁴ However, their success was limited. Worse, when the American heavy bombers finally did arrive the aim was bad, disrupting the Allied troops preparing for the next advance and causing some friendly casualties.⁷⁵ When the advance did get under way again, 2nd TAF's fighter-bombers provided some close support, but amongst other things they were distracted by the sudden need to concentrate all available air power on the German offensive around Mortain (see below). TOTALIZE never did recover its momentum and sputtered out on 10 August⁷⁶. The No. 84 Group Operations Record Book somewhat mournfully noted " it cannot be said that close support

operations played a decisive part in what small achievement the ground forces made."⁷⁷

LÜTTICH, 7 August

Coincidentally, the Germans had also chosen 7 August as the start date for their only major offensive of the campaign, what they called Operation LÜTTICH, and what English language historians generally refer to as the "Mortain counter-attack." This operation, ordered by Hitler personally on 2 August, concentrated four panzer divisions, the main bulk of the remaining German armour, at the west end of the German line, in an effort to reach Avranches and cut-off the US forces that had broken through.⁷⁸ However, Allied intelligence, in particular the ULTRA decrypts of the Germans' most sensitive signal communications, provided warning of the impending German attack.⁷⁹

It came early on the morning of 7 August. Jumping off without a preparatory artillery barrage in a futile attempt to gain surprise, three armoured columns struck the US lines.⁸⁰ At first they made good progress against the American outposts, but they did not succeed in panicking the defenders and, forewarned by ULTRA, the Allies reacted quickly. After hurried consultation, the commanding general of the US IXth Air Force and Coningham personally agreed that the US planes would concentrate on the Luftwaffe, preventing any German aircraft from reaching the battle area, while 2nd TAF, in particular the rocket firing Typhoons, concentrated upon the attacking German panzers.⁸¹ The result was one of the most dramatic air interventions of the campaign.

The morning had been marked by ground mist, but by the time the first 2nd TAF aircraft appeared overhead, about 1300 hours, it was a gorgeous sunny afternoon.⁸² In his recent memoirs,

a 2nd TAF Typhoon pilot wrote:

There was no problem ... identifying the target because the Panzer division was stretched out all along the straight road. The Squadron flew parallel to the long column in line astern, then winged over and started the dive from about 4,000 feet, heading for the lead tanks which were their prime objective.⁸³

Another Typhoon pilot recalled:

We could see Tiger tanks and armour on a track through the woods. We attacked with our rockets and then strafed with our cannon and did a fair amount of damage.⁸⁴

In all 294 Typhoon sorties were flown against LÜTTICH that day, armoured columns caught concentrated on roads forming an ideal target.⁸⁵ The German drive bogged down after only very slight gains.

Exactly how much of a factor in the German failure the Typhoons actually were has become the subject of fierce controversy.⁸⁶ The Germans, at any rate, almost universally attributed their failure to the air attacks.⁸⁷ What is clear is that at the time the RAF firmly *believed* that they had decisively intervened in the land battle and stopped the German offensive. Coningham wrote:

It was the first occasion in Normandy when the air forces had the opportunity of striking as a German armoured concentration. ... The fighter-bombers of the Second Tactical Air Force adopted a "shuttle service" of attacking formations, and as the day developed it was obvious that air history was being made...

... This was to date one of the best demonstrations of the tactical use of air power which had been given in this war. It proved that a Tactical Air Force may be a decisive battle winning factor.⁸⁸

TRACTABLE, 13 August

By 10 Aug both TOTALIZE in the east and LÜTTICH in the west had petered out, leaving the German forces in what was now very clearly a pocket. Montgomery ordered renewed efforts to

close the encirclement and, it was hoped, capture the bulk of German 7th Army. LÜTTICH having failed so completely the Germans, meanwhile, switched their attentions to extricating 7th Army through what came to be known as "the Falaise Gap." On the evening of 12 August No. 2 Group's maximum effort concentrated upon all of the transportation means out of the Falaise area, including the Seine crossings.⁸⁹

In this environment, 1st Canadian Army mounted Operation TRACTABLE, one last effort to push south and finally close the gap. For its part, 2nd TAF was concentrating upon destroying as much of German 7th Army as possible, as it crowded through the narrow roads leading out of the pocket. Quickly, the German retreat became a rout of historic proportions. Group Captain "Johnnie" Johnson, commanding a Spitfire wing in 2nd TAF, recalled:

When we arrived over that small triangle of Normandy bounded by Falaise, Trun and Chambois, the Typhoons were already hard at work. As at Mortain, they used the tactic of sealing off the front and rear of a column by accurately dropping a few bombs, thus compressing the desperate enemy on the narrow, dusty lanes. Since the transports were sometimes jammed together four abreast, this made the subsequent rocket and cannon attacks comparatively easy.

Immediately the Typhoons withdrew from the killing ground, the Spitfires raced into the attack. The tactics of the day were low-level strafing attacks with cannon shells and machine guns against soft-skinned transports, including all types of trucks, staff cars and lightly armoured vehicles.⁹⁰

Of that time, a ground officer working in a Spitfire wing headquarters recalled:

The pilots were pretty excited, I remember. They'd come rushing into the bullpen, vying with each other to relate what they had done and eager to find out if they'd beaten the other squadrons. Then they'd hustle out to have another go at the Jerries.⁹¹

Once again, there remains a fierce controversy over how much damage was actually done to the Germans by air action in the mouth of the gap, in particular to their armour. But once again, at

the time -- and amongst air historians since -- the conclusion has been that it was "an outstanding triumph of air power."⁹²

Allied armies finally closed the gap on 21 August, ending the Normandy campaign with the destruction of the greater part of the German armies in France.

1. The official histories are still an excellent place to start: Lionel F. Ellis, *Victory in the West Vol I The Battle of Normandy*, (London: HMSO, 1962), for the British; and C.P. Stacey, *Official History of the Canadian Army in the Second World War, Volume III, The Victory Campaign: The Operations in North-West Europe, 1944-1945* (Ottawa: Queen's Printer, 1966) for the Canadians. More recent British histories of note include John Keegan, *Six Armies in Normandy* (London, The Trinity Press, 1982); and Max Hastings, *Overlord: D-Day and the Battle for Normandy, 1944*, (London: Pan, 1984). The definitive recent work on the Canadian Army in Normandy is John English, *The Canadian Army in the Normandy Campaign: A Failure in High Command* (New York: Praeger, 1991). Probably the best scholarly analysis of the campaign overall is Carlo d'Este, *Decision in Normandy*, (London: William Collins Sons & Co. Ltd., 1983).
2. AEAFF Headquarters, "AEAFF Overall Air Plan for Op NEPTUNE", NAC RG 24 Vol 10400 file 200A2.016(D1).
3. See John Terraine, *The Right of the Line* (London: Hodder & Stoughton, 1985) p 620, but the best examination of this is probably found in Murray Williamson, *Luftwaffe* (London) pp 143-242.
4. AEAFF Overall Air Plan for Op NEPTUNE, para 17.
5. AHB narrative, "Report on Air Operations" PRO AIR 37/757, para 247.
6. Ibid, para 244.
7. This is lamented in the fighter pilots' memoir Johnnie Houlton, *Spitfire Strikes: A New Zealand Fighter Pilot's Story* (London: John Murray Publishers, 1985) p 181.
8. Brereton Greenhous et al, *The Official History of the Royal Canadian Air Force Vol III The Crucible of War, 1939-1945* (Toronto: University of Toronto Press, 1994), p 294.
9. 421 Squadron *Operations Record Book*, 6 June 1944.

10. AHB, *Air Support, The Second World War 1939-1945: Royal Air Force* (Air Ministry: Air Publication 3235, 1955) pp 146-147.
11. Ibid.
12. Terraine, *The Right of the Line*, p 633.
13. "Operations Order No. 3", 3 Jun 44, quoted in Michael Bowyer *2 Group R.A.F.* (London: Faber and Faber, 1974), p 368.
14. Ibid, pp 374-375.
15. Bowyer, *2 Group R.A.F.*, pp 369-373 gives an account of these missions.
16. AEAF Overall Air Plan for Op NEPTUNE, para 25.
17. Ibid.
18. Carlo D'Este, *Decision in Normandy*, (London: William Collins Sons & Co. Ltd., 1983), pp 162-163. Bayerlein, Panzer Lehr's commander, was particularly bitter because he had wanted to wait for darkness before moving forward, but had been overruled.
19. Summary of Conference Minutes, PRO AIR 37/1213, p 520, the full text of the minutes is in appendix VI/129 to the same document.
20. Ralph Bennett, *ULTRA in the West: The Normandy Campaign 1944-45*, (New York: Charles Scribner's Sons, 1979), p 68.
21. Terraine, *A Time for Courage*, p 636.
22. Ibid. See also Richard Hallion, *Strike From the Sky* (Washington: Smithsonian Institute Press, 1989), p 205.
23. Terraine, *The Right of the Line*, p 637.
24. Brereton Greenhous et al, *Crucible of War*, p 300. The honour went to Nos. 303 and 130 Squadrons.
25. Ibid.
26. Terraine, *The Right of the Line*, p 638.
27. Ibid.
28. A subject of continuing controversy. See in particular D'Este, *Decision in Normandy*.

29. AHB narrative, *The Liberation of North West Europe Vol IV The Breakout and the Advance to the Lower Rhine, 12 June to 30 September 1944*, PRO AIR 41/67 p 16.
30. Ibid, p 14.
31. L.F. Ellis, *Victory in the West Vol I The Battle of Normandy*, (London: HMSO, 1962), p 280.
32. AHB, *The Breakout and the Advance to the Lower Rhine*, pp 19-20.
33. Ellis, *The Battle of Normandy*, p 284. See also AHB, *The Breakout and the Advance to the Lower Rhine*, p 19.
34. AHB, *The Breakout and the Advance to the Lower Rhine*, p 20.
35. Ibid, pp 20-22.
36. Ibid, pp 20-22.
37. "Operation CHARNWOOD - Air Support D-Day" 7 July 1944, NAC RG 24 Vol 10913 file 235C3.095(D2). The request for heavy support appears to have been passed from headquarters 21st Army Group to headquarters Advanced AEF to Bomber Command. At this time Advanced AEF was Coningham's headquarters.
38. AHB, *The Breakout and the Advance to the Lower Rhine*, p 23.
39. Ibid.
40. AHB, *Air Support*, p 150 asserts that this is because the heavy bombers' target area "did not contain any of the enemy's defensive positions which were in fact much closer to the British line."
41. "Observations on Bomber Command Attack on Caen, 7 July 1944", PRO AIR 37/1255, cited in D'Este, *Decision in Normandy*, p 316.
42. AHB, *The Breakout and the Advance to the Lower Rhine*, p 24.
43. This remains the subject of controversy. Tedder firmly believed the operation was intended to try for a break-out, or rather, that Montgomery initially *claimed* to be trying for a break-out: Lord Tedder, *With Prejudice* (London: Cassell, 1966), p 561 & 571. Somewhat more cautiously, Keegan comes down on the same side, *Six Armies in Normandy*, pp 189-217. The Monty camp stoutly maintains that a breakthrough was never intended, Ellis *The Battle of Normandy*, p 349, or Nigel Hamilton, *Monty: Master of the Battlefield*, (London: Hamish Hamilton, 1986), p 733, which cites Dempsey as actually arguing that Montgomery deliberately lied to the RAF about the intentions in order to convince them to offer full support. Splitting things down the middle, D'Este argues that Montgomery may not have been trying for a break-out, but that he was at least trying to

seize "full control of the Caen-Falaise Plain as far south as Falaise itself." *Decision in Normandy*, p 399n.

44. AHB, *The Breakout and the Advance to the Lower Rhine*, pp 45-46.
45. Ibid, p 47.
46. "2 Brit Army Air Req GOODWOOD" NAC RG 24 Vol 10554 file 215B2.013(D1).
47. AHB, *Air Support*, p 154.
48. No. 83 Group *Operations Record Book*, PRO AIR 25/704, 18 July 1944.
49. AHB, *The Breakout and the Advance to the Lower Rhine*, p 47.
50. Ibid.
51. Major General Sir Francis De Guingand, *Operation Victory*, (London: Hodder & Stoughton, 1947), p 403.
52. No. 83 Group *Operations Record Book*, 18 July 1944.
53. AHB, *The Breakout and the Advance to the Lower Rhine*, p 48.
54. Ibid.
55. Ibid, p 47.
56. Brereton Greenhous et al, *The Crucible of War*, p 312.
57. Hastings, *Overlord*, p 235.
58. Ellis *The Battle of Normandy*, p 351. The operation's meagre results sparked a firestorm of controversy in the highest Allied war councils and nearly cost Montgomery his job. See in particular Hamilton, *Monty: Master of the Battlefield*, pp 731-740 and D'Este, *Decision in Normandy*, pp 391-399.
59. No. 84 Group *Operations Record Book*, PRO AIR 25/709, 22 July 1944.
60. C.P. Stacey, *The Victory Campaign* (Ottawa: Queen's Printer, 1966) p 183.
61. Ibid.
62. Headquarters 2nd Canadian Corps, "Air Programme Operation SPRING", 23 July 1944, NAC RG 24 Vol 10800 file 225C2.013(D9).

63. Stacey, *The Victory Campaign*, p 188.
64. Ibid, p 193.
65. J. How, *Normandy, The British Breakout* (London: 1981) argues, as the title suggests, that BLUECOAT constituted a breakout, if only Montgomery and the other British senior commanders (in particular Lieutenant General Bucknall commanding XXX Corps), had exploited it properly. Although Bucknall was indeed relieved for his lacklustre performance in BLUECOAT, other historians seem not to have picked up this theme of a lost major opportunity. It is difficult to see how an offensive in the centre of the line, in the worst of the Bocage, could have led to decisive results.
66. Stacey, *The Victory Campaign*, p 202. No. 84 Group *Operations Record Book*, 11 August 1944 noted: "With effect from midnight tonight this Group takes over the operational control of its fighter-bomber squadrons ... At long last 84 Group assumes its responsibility towards First Cdn Army."
67. Bowyer, *2 Group R.A.F.*, p 382.
68. English, *Failure in High Command*, p 267. On 5 August Crerar made a rather grandiose speech to at his headquarters comparing the impending Operation TOTALIZE to the Amiens operations of the Hundred Days at the end of the First World War. See Chester Wilmot, *The Struggle for Europe*, London: Collins, 1954, p 411.
69. "First Canadian Army Op TOTALIZE Air Support" 17-1-2/Ops "Part I - General Considerations", 4 August 1944, NAC RG 24 Vol 10671 file 215C1.096(D3). Emphasis added.
70. *84 Group Operations Record Book*, 7 August 1944.
71. Stacey, *The Victory Campaign*, p 218.
72. Headquarters 2nd Canadian Corps, "Op TOTALIZE Air Programme" NAC RG 24 Vol. 10671 file 215C1.096(D3).
73. Roman Jarymowycz, "Canadian Armour in Normandy: Operation Totalize and the Quest for Operational Manoeuver" *Canadian Military History*, Vol 7, No 2, Spring 1998, pp 19-40.
74. Op TOTALIZE Air Programme.
75. Jarymowycz "Canadian Armour in Normandy: Operation Totalize and the Quest for Operational Manoeuver" pp 19-40; English, *Failure in High Command*, pp 277-278; Stacey, *The Victory Campaign*, pp 222-224.
76. Jarymowycz "Canadian Armour in Normandy: Operation Totalize and the Quest for Operational Manoeuver" p 33; English, *Failure in High Command*, p 283; Stacey, *The Victory*

Campaign, p 231.

77. No. 84 Group *Operations Record Book*, 9 August 1944.

78. D'Este *Decision in Normandy*, pp 414-415.

79. It should be noted, however, that ULTRA missed the original 2 August order for LUTTICH, catching only the operations order of 6 August, thus giving less than a days warning. Bennet, *ULTRA in the West*, p 114-119.

80. Keegan, *Six Armies in Normandy*, p 246.

81. AHB, *The Breakout and the Advance to the Lower Rhine*, p 85.

82. *Ibid*, p 86.

83. John Golley, *The Day of the Typhoon: Flying with the RAF tankbusters in Normandy*, (Wellingborough, Patrick Stephens, 1986), p 132.

84. Quoted in J.E. Johnson and P.B. Lucas *Winged Victory*, (London: Stanley Paul, 1995), p 164.

85. "Report on attacks on enemy tanks and M.T. in the Mortain Area - 7th August 1944", PRO AIR 2/7870, para 4.

86. See Gooderson, *Air Power at the Battlefield*, Chapter five, for a conservative reassessment of the damage Allied air power did to the German armour. For the air power enthusiasts' viewpoint, see Hallion, *Strike from the Sky*, p 226.

87. For example Milton Schulman, *Defeat in the West* (London: 1948) p 148; Hans Speidel, *Invasion 1944: Rommel and the Normandy Campaign*, (Chicago, 1950) p 131. Of course, the German soldiers needed an excuse for their failure.

88. Air Marshal Sir Arthur Coningham, post-war report "Operations Carried Out by Second Tactical Air Force Between 6th June 1944 and 9th May 1945", PRO AIR 37/876, pp 10-11.

89. Bowyer, *2 Group R.A.F.*, p 384.

90. J.E. Johnson and P.B. Lucas, *Winged Victory*, (London: Stanley Paul, 1995), p 166.

91. Monty Berger and Brian Jeffery Street, *Invasions Without Tears*, (Toronto: Random House of Canada, 1994), p 72.

92. Terraine, *The Right of the Line*, p 662.

CHAPER FIVE: ANALYSIS

How to bring their surfeit of air power to bear on the enemy represented an enormous command and staff problem for the Western Allies. Central to this problem was the difficult issue of targeting.

What can be deduced from the history of 2nd TAF's campaign in Normandy? An important factor to unravel is the allocation that of 2nd TAF's air power. What percent of available capacity was consumed by close support missions? What percent by deeper strikes such as armed recces? The answers to those questions should help to clarify exactly what was going on with air support.

The overall allocation of sorties within 2nd TAF throughout the Normandy campaign was as follows¹:

	Medium & Light Bombers	Defensive Fighter Missions	Ground-Attack (pre-arranged & impromptu)	Armed Recce	Recce (Tac/R and other types)
June	3,117	18,062 (58 %)	7,652 (25 %)	5,277 (17 %)	3,810
July	3,304	14,528 (55 %)	6,484 (24 %)	5,527 (21 %)	3,025
August	3,990	7,325 (29 %)	3,850 (15 %)	14,169 (56 %)	3,918

Table 7: 2nd TAF sortie allocation in the Normandy campaign.

(The percentage figures refer to that mission type as a percentage of the fighter-bomber effort, ie as a percentage of the centre three columns, not as a percentage of the overall 2nd TAF effort.)

The medium and light bombers category reflects the work of No. 2 Group, and to a lesser extent No. 85 Group. Because of the type of aircraft operated by those groups, their effort could

not be re-allocated to other missions. This is also true of the reconnaissance category, which was performed by the specialized aircraft dedicated to that role. Thus the sortie rates in those categories show comparatively little change over the course of the campaign. The more interesting columns are the centre three: defensive fighter missions, ground attack and armed recce. Those are the three missions types that the fighter-bomber effort could be and was shifted between.

The data reveal several trends, in particular the precipitous decline in effort allocated to defensive fighter missions in light of the overwhelming Allied air supremacy, and a corresponding climb in the effort allocated to armed recce.² It is quite clear that the composite groups expended more sorties on armed recce missions than close support.³ The data also *seems* to show a significant decline in ground attack missions, from 25 to 15 percent. This decline, however, reflects a decline in the number of ground attacks resulting from either pre-arranged or impromptu requests for air support. It must be understood that many of the armed recce missions resulted in the attack of ground targets in the German rear. Indeed, overall attack on the German army from the air actually peaked in August during the attack on LÜTTICH and the intense strafing of the German rout through the mouth of the Falaise pocket. Yet because most of those missions were classed as armed recce, August shows the lowest rate of ground attack for the whole campaign. Unfortunately, as the above example illustrates, because of the way records were kept, it is not always easy to determine how 2nd TAF's sorties were distributed.

CABRANK

CABRANK is especially difficult to pin down from the records extant. The composite

groups' Operations Record Books⁴ (ORBs) do not give specific mention to CABRANKs at all, merely differentiating between defensive missions, reconnaissance missions, armed reconnaissance, and what is variously termed either "dive bombing", "immediate support" or "close support."⁵ Presumably both of the second two are direct support attacks on targets near or along the front, both pre-arranged and impromptu. We do know, however, that CABRANKs were considered a profligate arrangement and were used sparingly, generally reserved for what were deemed to be critical junctures.⁶ Since all CABRANK aircraft were given "default" targets to attack if no impromptu target was assigned in the air, in fact all such missions became either a pre-arranged or an impromptu attack, and are recorded as such in the various ORBs.⁷

Pre-arranged vs Impromptu

With regard to the proportion of effort expended on pre-arranged versus impromptu missions, once again the operations record books are not overly helpful. Many days, no reference at all is made to "pre-arranged", "impromptu" or "immediate" sorties. Other days, there are specific entries for "immediate support", but none for anything that could be construed as pre-arranged. In some cases, this is clearly inaccurate. For example, the No. 83 Group ORB entry for 8 July declares the following sortie totals:

<u>8 July 1944</u>	
Armed Reconnaissance	320 sorties
Immediate Support	223 sorties
Defensive Cover	145 sorties
Reconnaissance	69 sorties. ⁸

No mention is made of any pre-arranged missions. However, 8 July was the first day of Operation

CHARWOOD, and we know from other sources that No. 83 Group did indeed fly many pre-arranged missions that day.⁹ It seems, therefore, that the ORB simply lumped all close support missions under the general rubric of "immediate support." On other days, for instance 5 July, "close support" is the term the ORB used to describe all fighter-bomber attacks along the front:

<u>5 July 1944</u>	
Armed Reconnaissance	224
Close Support	107
Defensive Cover	191
Reconnaissance	34. ¹⁰

Elsewhere, however, the ORB does distinguish between pre-arranged and impromptu sorties, apparently referring to the latter as "immediate support":

<u>4 July 1944</u>	
Armed Reconnaissance	138
Pre-arranged Support	48
Immediate Support	63
Defensive Cover	215
Reconnaissance	34

In all, it would appear that about 40 percent of the composite groups' sorties were consumed by defensive fighter missions, 35 percent by armed recce, 15 percent by pre-arranged missions, and 10 percent by impromptu close support. Discounting the defensive fighter sorties in order to focus purely on the effort allocated to the various types of ground attack missions, the figures become roughly 60 percent armed recce, 25 percent pre-arranged, and 15 percent impromptu. In other words, impromptu close support was not allocated a great proportion of 2nd TAF's effort, and armed recce was.

Armed Recce

In fact, armed recce has been singled out, at the time and since, as 2nd TAF's single most effective form of air attack. Ian Gooderson devotes a chapter of his book to a detailed analysis of armed recce's effectiveness, coming to the conclusion that armed recce was of far greater value to the Allied war effort than close support.¹¹ Ultimately, Gooderson concludes, "the armed-reconnaissance tactical air offensive ... [was a] vital role for Allied air power in 1943-45. Close air support was not, though it did undoubtedly provide certain advantages that could be exploited by Allied troops."¹² Hallion echoes the same theme,¹³ as does Terraine.¹⁴

It is not clear that the army critics fully appreciated the greater utility of air power in the deeper roles. Indeed, the army criticisms, then and now, seem to boil down to the complaint that 2nd TAF would not "whistle up" fighter bombers at a moment's notice wherever some front-line commander happened to come under pressure. As we can see from the contemporary doctrine -- and from the actual apportionment statistics from the campaign -- this has more to do with the relatively low priority assigned to close support than it does to RAF intransigence.

Critics might respond that the low priority given to close support in itself demonstrated RAF intransigence. That would be to ignore that close support was the method of attack doing the least damage to the Germans -- or at least, that the RAF *believed* that deeper attacks were doing the most damage. And believe this they did, even at the time. An "Operational Research" study undertaken in July 1944, "confirms the overall effectiveness of widespread armed recce in confusing and delaying the enemy's supplies, at the same time inflicting serious losses when targets have actually been located and attacked."¹⁵

True or not¹⁶, this was a contention that the Army critics have not addressed. Once again, the issue comes back to the envisioned role for tactical air power. Which is more important: more fire support along the front-line or disrupting overall enemy movement?

Target Areas

Another key factor in unraveling what was being done with tactical air power is to consider where it was being applied. What is striking about the patterns of 2nd TAF's effort -- considering the RAF's doctrine and emphasis on concentration rather than "penny packeting" -- is how dispersed 2nd TAF's effort was.

Viewed overall, 2nd TAF's effort can be divided into two general categories: close support, that is targets very close to or in many cases right on, the front line, and the deeper targets. As we have seen above, almost all of the pre-arranged air support by the composite groups was for targets within 20, often 10, kilometres of the front line. By their very nature impromptu calls for close support were for tactical targets immediately on the front line itself. The deeper targets were primarily the work of No. 2 Group, and the armed recces flown by the composite groups.

With the exception of major offensives, the close support effort was not particularly focused, being driven from the "bottom-up", rather than the "top-down" (ie requests were initiated by forward troops, either through ASSU channels for impromptu missions or up the Army chain-of-command for consideration at the daily air conference for pre-arranged missions). With the exception of major offensives such as GOODWOOD, No. 2 Group's efforts were remarkably diffused. For instance, the night of 27/28 July saw the group's attacks scattered from Aire in the

Pas de Calais to Dijon. This was not unusual.

A perception of unfocused effort is furthered by the means used to direct the armed reces were directed, which appears to have been on a simple geographic basis. Headquarters 21st Army Group and 2nd TAF allocated areas for armed recce coverage to each Composite Group, and these areas were further sub-divided and allotted to Wings by the respective GCC.¹⁷ At the time the RAF considered this an effective system because air reconnaissance information arrived at the GCCs first, and could therefore be used immediately to direct the armed recce effort.¹⁸ This is doubtless true, but the larger issue is that since the GCCs were purely RAF organizations dedicated to air control, the distribution of armed reces was in fact being determined by RAF planners in isolation from the Army. Presumably they simply directed armed reces to what were thought to be the most fertile hunting grounds within the assigned area. Most critically, there was no mechanism to *concentrate* armed reces in areas that would complement and enhance the overall Allied scheme of manoeuvre or campaign plan. It appears that armed reces were largely shotgunned out on the basis of aircraft availability and what were perceived to be fertile hunting grounds within arbitrary geographic areas that had been designated not to concentrate 2nd TAF's tactical air power, but primarily as a de-confliction control measure.¹⁹

Targeting Troubles

It is all very well to say that air power should be concentrated in some decisive way. What actual targets should be attacked to effect such decisive concentration? This was a key problem. As we have seen, under the doctrine of joint command "the Army Commander tells the Air Force

Commander what he wants to achieve, and the Air Staff, having examined the problem, make Air plans with the Army's aim constantly in view.²⁰

The British Army's immediate post-war analysis of air support contains some particularly bitter words about the RAF's approach.

The theory that the army should confine itself to stating the problem in general terms, and the air forces should then decide the method in all its detail has proved quite impracticable when applied literally in combined operations.²¹

In support of this, the report goes on to point out:

It is educative to realise that, in this campaign, out of every hundred attacks carried out from the air by the tactical air forces, it is estimated that at least ninety five have been on targets selected, named and annotated by the army alone, including in many cases the provision of the actual aiming points. With the exception of those targets directly related to the enemy air forces, it has been the army almost exclusively which has produced the targets, and which has been the principal contributor to the preparation of the air plan in direct support of a particular battle.²²

This is almost certainly a fair criticism, for as we have seen the RAF system did not include much provision for targeting. Targets were expected to come from either the daily planning conferences -- where it would be the Army that raised them -- or up through the ASSU net, also from the Army. Second TAF lacked the necessary staff to select any actual targets for attack other than through those two mechanisms. More critically, the RAF overall lacked the expertise and the doctrine for target selection in a land campaign.²³ After all, just what are the best targets to attack with air power -- especially given the technical limitations of the time -- when one wants to, for instance, ensure that "enemy road movements ... [are] continually harassed."²⁴ Bridges? Road choke points in villages? Columns on the move?

The basic air support doctrine of the time confined its discussion of targeting to noting that: Suitable targets for light and medium bombers will be railway yards, concentrations of MT

and AFVs in harbour, defiles and villages where enemy HQs and Signals centres are located, and dumps -- if not too widely dispersed.

Single-engine fighters will attack gun positions or AFVs when separated from their soft-skinned vehicles, with RP; and MT, when badly dispersed or in column, with bombs and front gun fire.²⁵

Rather unhelpfully, this discussion was not expanded upon to consider what sorts of targets might be appropriate in what circumstances, or even what the most profitable target types might be.

Air Support Instructions developed in the campaign, which might have been expected to amplify the generic doctrine and give more concrete detail were similarly vague:

TYPES OF TARGETS

... the following policy will apply until further notice to specific types of targets in the priorities set out below:

- (a) HQs and Comms Installations;
- (b) Bridges;
- (c) Enemy Concentrations;
- (d) Administrative Installations; and
- (e) Guns and Defensive Works.²⁶

Quite simply, the doctrine of the time had not thought these issues through. If the RAF wanted to maintain that air officers were the sole experts on the application of air power, then reasonably they should have addressed the targeting issue rigorously.²⁷

Another reason for this difficulty with targeting is that picking out targets in an enemy's rear requires a great deal of quite detailed intelligence: not just general intelligence about an enemy's overall intentions, but specific intelligence about exactly where there are concentrations of vehicles at any given moment -- in near real time. Historically, the Army had always relied upon actual observation of targets for the analogous targeting function with the artillery. How to target air attacks against movement in the German rear far beyond observation? One way of course was on

the basis of ULTRA decrypts, and as we have seen this resulted in the early destruction of headquarters Panzer Group West. But such successes were rare, and most behind-the-lines targeting had to rely upon Tac/R reporting.

An insight into the difficulty of targeting came early in the campaign. On 8 June the AEAFC Commander in Chief, Air Marshal Leigh-Mallory, visited General de Guingand, Montgomery's Chief of Staff. During the course of the meeting, which concerned overall planning for interrupting German movement to the Normandy area, de Guingand admitted that the Army could not supply the Air Force with more targets for 2nd TAF. "Such targets might turn up as the fighting developed."²⁸ Apparently, only two days after the invasion, with the Allies still clinging precariously to their narrow beach-head, it was not possible to identify a comprehensive package of specific targets for attack by tactical air power. That it proved hard for the army to identify targets in those circumstances, when German formations were still crowded around the beach-head, shows how difficult targeting really is.

Indeed, the difficulties of targeting in large part explain the development of the armed recce procedure. Generally, it was simply too difficult to target specific attacks, so aircraft were sent off to look for their own.

1. Data from an immediate post-war ORS study "Armed Recce by Aircraft of 2nd TAF in the West European Campaign" PRO WO 291/1357.
2. Interestingly, it also attests to a slow but steady decline in total sorties flown by 2nd TAF throughout the campaign. This despite the establishment of airfields on the continent.
3. Gooderson, *Air Power at the Battlefront*, p 200 also makes this point.

4. The Operations Record Books for groups are found in the PRO AIR 25 files, for wings in AIR 26 and squadrons in AIR 27. No. 83 Group ORB is found in PRO AIR 25/704; No. 84 Group in 25/709.
5. 83 Group *Operations Record Book*. See for instance any of the entries for June 1944.
6. AHB, *Air Support, The Second World War 1939-1945: Royal Air Force Air Ministry: Air Publication 3235*, 1955. (originally a classified report), p 149.
7. Ibid.
8. 83 Group ORB 8 July 1944
9. The air support programme for CHARNWOOD (found in NAC RG 24 Vol 10913 file 235C3.095(D2)) lists seven pre-arranged targets to be struck by fighter-bombers between 0600 and 0730.
10. 83 Gp ORB 5 Jul 44
11. Gooderson, *Air Power at the Battlefield*, Chapter 8.
12. Ibid, p 245.
13. For instance, Richard P. Hallion "Battlefield Air Support A Retrospective Assessment" *Airpower Journal* Spring 1990 p 11; or his book *Strike from the Sky* (Washington: Smithsonian Institution Press, 1989).
14. Terraine, *The Right of the Line*, pp 658-662.
15. "RP & F/B effectiveness 22 Jun-7 Jul" noted in 8 July entry of 84 Group *Operations Record Book*.
16. Once again, really the jury remains out on this issue; see comments in the introduction. What is important to a study of doctrinal development is what the contemporary parties *believed* to be the case.
17. War Office, *Air Support and Air Reconnaissance, Aspects of Combined Operations in North West Europe, June 1944 - May 1945* immediate post war report found in PRO AIR 37/881, Chapter 3, p 10.
18. Ibid.
19. A de-confliction control measure is, like traffic lines on a highway, an airspace control measure to separate aircraft.

20. Headquarters No. 84 Group, "Organization of Staffs and Operations Rooms at R.A.F. Composite Group and Army Headquarters" no date, probably late 1944, PRO AIR 2/7870.
21. WO, *Air Support and Air Reconnaissance*, Chapter 1, pp 7-8.
22. Ibid.
23. For that matter, selection of targets for strategic bombing also proved devilishly difficult, something which had not been anticipated by any of the pre-war bombing enthusiasts.
24. To quote the AEAFF Overall Air Plan for Op NEPTUNE, NAC RG 24 Vol 10400 file 200A2.016(D1).
25. WO, *Army/Air Operations Pamphlet No. 2 Direct Support*, (26/GS Publications/1181), 1944, pp 9-10.
26. Headquarters 1st Canadian Army, "AIR SP INSTR NUMBER 1" 2 August 1944, file AIR/0/1-2 found in DHH 958C.009(D72).
27. Interestingly enough, the modern United States Air Force has an entire trade specialization known as a "targeteer". These are people specifically trained in determining what targets should be hit to achieve a given general aim, and what specific air weapons should be used against those targets.
28. Record of their meeting found in PRO AIR 37/1213, para 470.

CONCLUSION

It is very clear that the system developed to control air support, whatever its doctrinal origins, was technically a marvel. It could indeed rapidly and concertedly apply air power against the enemy, as demonstrated around Mortain and the mouth of the Falaise gap. Furthermore, it *did* include specific provisions for getting air support onto targets within moments of request -- the CABRANK system.

So what are we to make of the criticisms from some quarters of the Army camp that air support was intransigent, or at least unresponsive? Such criticisms seem to come down to the complaint that 2nd TAF would not delegate on-call fighter-bombers to every local commander along the front who wanted them, as they wanted them. As we have seen, that would have been to ignore the issue of concentration of force. In fact, in doctrine and policy statements the Army did officially acknowledge that air power should be concentrated. Some Army commanders appear to have had false expectations about air support, and to a certain extent these false expectations have become conventional wisdom.

The only way to make the air support more responsive to every Army request from the front would have been to allocate a greater weight of effort to immediate close support -- at the expense of other mission types, in particular armed recon. It is not clear that overall this would have been more effective. It is clear, on the other hand, that at those times when it *was* considered important to concentrate air power for direct intervention in the land battle -- for major offensives, around Mortain, and during the closing of the Falaise gap -- 2nd TAF's effort was devoted whole-heartedly to direct support.

All of this touches upon what is perhaps the central historical debate of the Normandy campaign -- the performance of the Allied armies, in particular at the operational level. Many

historians have been sharply critical of the Allied commanders handling of the campaign. Professor Granatstein describes Canadian operations as "characterized by staff-driven and top-down control ... [that] invariably featured heavy artillery preparation and small-scale objectives."¹ Bill McAndrew graphically put it another way, describing Canadian operations as progressing like a "giant slinky toy" -- armour and infantry ponderously moving forward under cover of heavy artillery, and if a break-through was achieved, tending to wait for their artillery to close-up before exploiting.² Other historians have made the same points about both the British and American Armies.³

What appears to have happened is that as break-through attempt followed break-through attempt -- without success -- the Army became ever more dependent upon firepower to batter their way forward. This propensity later led Tedder to wryly observe: "The Army having been drugged with bombs, it is going to be a difficult process to cure the drug addicts."⁴ The Army commanders also became increasingly fixated upon the tactical level of the fighting, losing their sense of the operational art.⁵ Unsurprisingly, therefore, the air support they called for was narrow in nature, tending towards a desire for on-call tactical help everywhere, with massive heavy-bomber raids to precede any advance.

To be fair to the Army critics, however, it is equally clear that the RAF was not properly prepared for fighting a land campaign. They lacked the expertise and machinery for effective targeting, and by default this central function fell into the Army's lap. This while the RAF was stoutly maintaining that only air officers were expert in the application of air power. As a result, 2nd TAF's efforts throughout the campaign were not as focused as they perhaps could have been.

Why did this happen, when the air support doctrine of the time stressed concentration and even included prescient warnings against "the temptation to abuse the flexibility of air

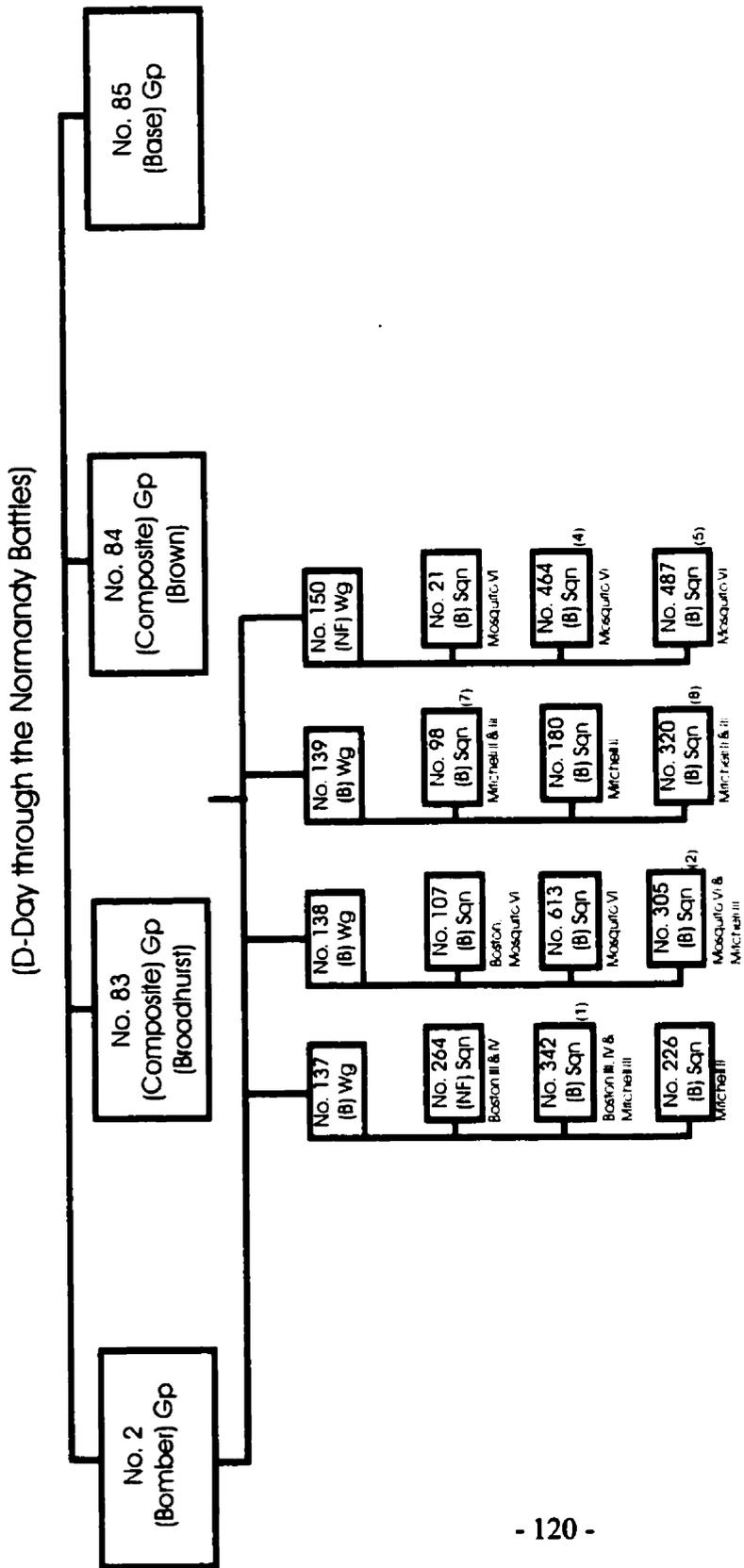
power" by "frittering away the effort on relatively unimportant targets." It seems that in the heat of battle -- and clash of personalities between key commanders -- practice ran away from doctrine. Arguably this reflected the difficulty of the moment, and the inherent limitations of the doctrine in the first place. Certainly the Army critics would view it that way.

However, air support doctrine was not really fully developed. Because of the all-consuming Army/RAF arguments over air power and strategic bombing, neither side gave much serious thought to applying air power in a land campaign. When it was finally decided, very late in the day, to form tactical air forces for just this role, all of the available energy was consumed by frantic efforts to knit together a working organization and solve the immediate practical problems. In this an extraordinary success was achieved, but little time or energy was left over for contemplation of the more subtle -- and difficult -- doctrinal questions, such as where to concentrate the air effort and how to effect the actual targeting. Doubtless too, this doctrinal failure on the RAF's part reflected the larger doctrinal failure of the Allied forces at the operational level.

Nevertheless, the campaign was in the end successful for the Western Allies. Given the near run nature of that success, all of the Allied contributions were critical. Second TAF did succeed in helping defeat the German armies in the West. Although its doctrinal limitations made it a somewhat blunt instrument, it was a powerful one.

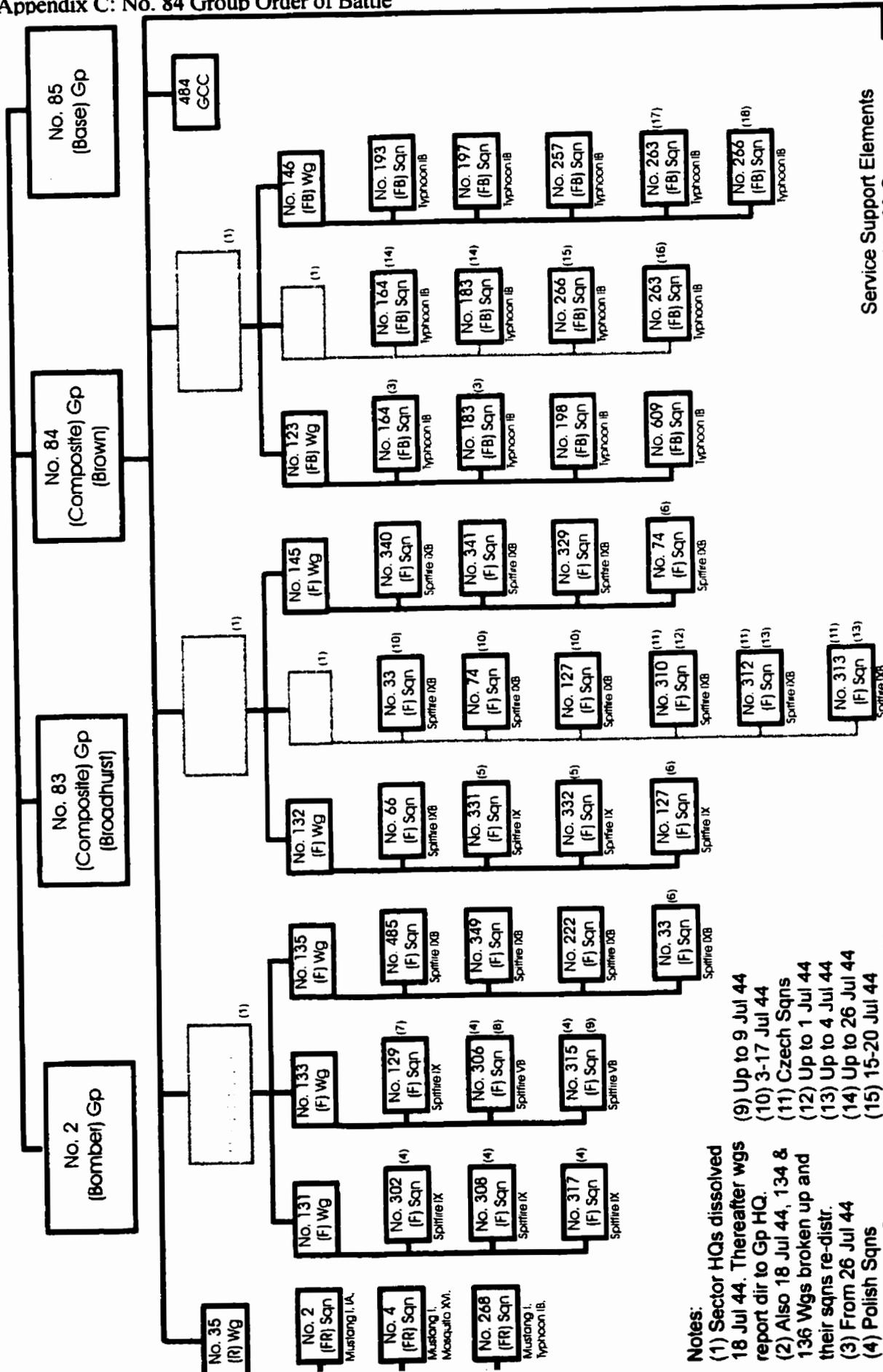
1. Jack Granatstein, *The Generals* p 264.
2. Quoted *ibid*.
3. See note 4 to the introduction.
4. Tedder, *With Prejudice*, p 606. He was referring to the Canadian Army's requests for heavy bombers for the Walchern Island operation in October 1944.
5. See in particular Jarymowycz "Canadian Armour in Normandy: Operation Totalize and the Quest for Operational Manoeuver"

Appendix A: No. 2 Group Order of Battle



- Notes:
- (1) French sqn.
 - (2) Polish sqn.
 - (3) Dutch sqn.
 - (4) Australian sqn.
 - (5) New Zealand sqn.

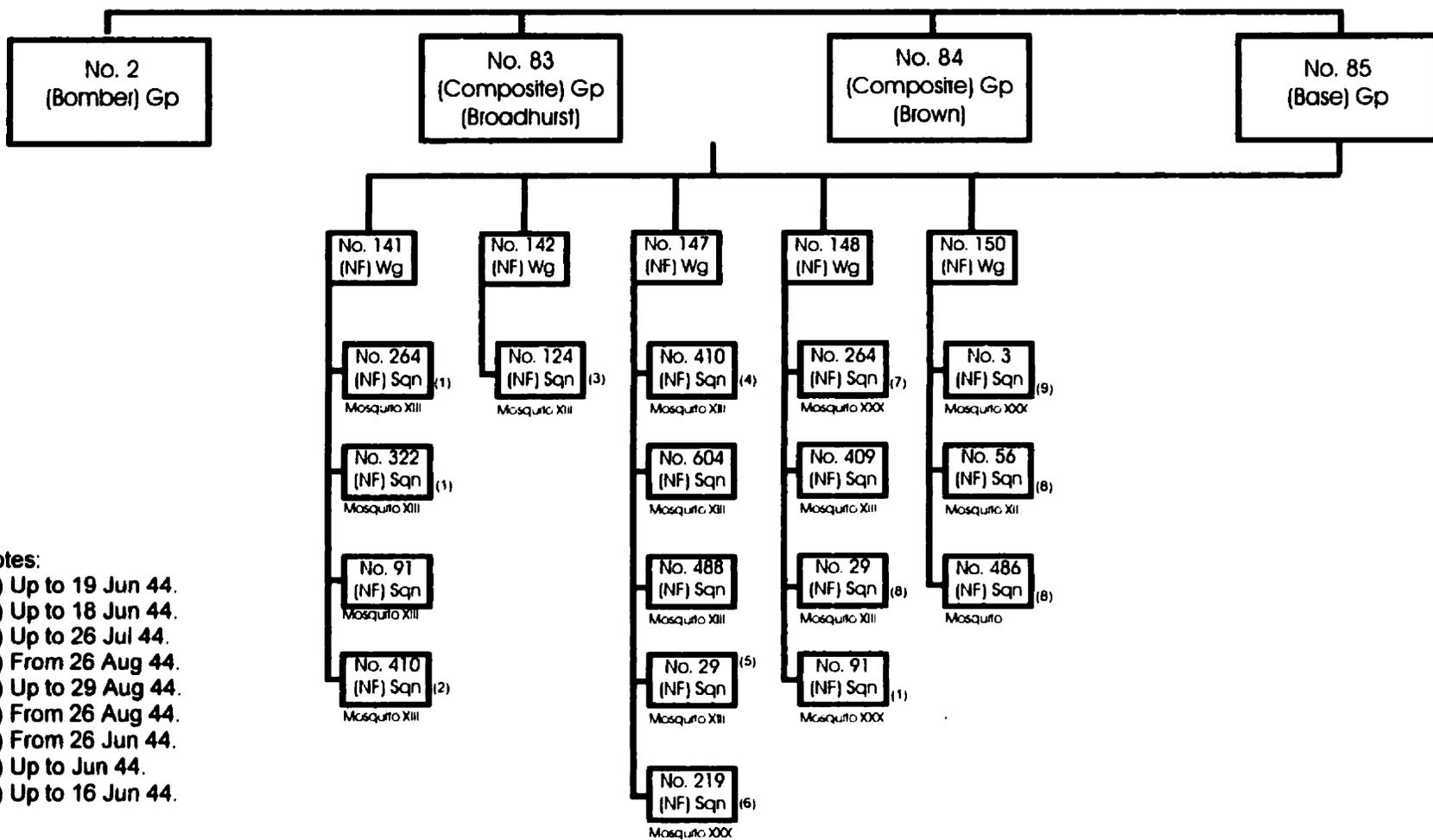
Appendix C: No. 84 Group Order of Battle



Service Support Elements
as per No. 83 Gp

Sources: No 84 Gp Ops Record Book
DHist file 181.006 (D230)

- Notes:**
- (1) Sector HQs dissolved 18 Jul 44. Thereafter wgs report dir to Gp HQ.
 - (2) Also 18 Jul 44, 134 & 136 Wgs broken up and their sqns re-distr.
 - (3) From 26 Jul 44
 - (4) Polish Sqns
 - (5) Norwegian Sqns
 - (6) From 17 Jul 44
 - (7) Up to 10 Jul 44
 - (8) Up to Jul 44
 - (9) Up to 9 Jul 44
 - (10) 3-17 Jul 44
 - (11) Czech Sqns
 - (12) Up to 1 Jul 44
 - (13) Up to 4 Jul 44
 - (14) Up to 26 Jul 44
 - (15) 15-20 Jul 44
 - (16) 10 Jul - 6 Aug 44
 - (17) From 6 Aug 44
 - (18) With 136 Wg 15-20 Jul 44
 - (19) Canadian Sqns
- NB 35, 123, 131 & 146 Wgs op under cmd No. 83 Gp during the initial brnd until 84 Gp HQ stood-up on the continent.



- Notes:**
- (1) Up to 19 Jun 44.
 - (2) Up to 18 Jun 44.
 - (3) Up to 26 Jul 44.
 - (4) From 26 Aug 44.
 - (5) Up to 29 Aug 44.
 - (6) From 26 Aug 44.
 - (7) From 26 Jun 44.
 - (8) Up to Jun 44.
 - (9) Up to 16 Jun 44.

NB: No. 85 Gp initially operated under control ADGB..

Appendix E: Examples of Air Support Mission Types

Pre-arranged Direct Support

ARMY FORM C 2136 (Large) MESSAGE FORM

Call Srt. No. Priority Transmission Instructions

ABOVE THIS LINE FOR SIGNALS USE ONLY

FROM (A) MAIN FIRST CDN ARMY Originator Date-Time of Origin 020025H

For Action:

TO MAIN 1 BR CORPS MAIN 2 CDN CORPS

(Y) Air Information (AI)

3 OF 3 CDS OF 1 TWT 4 AIR BRG

2 CDN CORPS Message Instructions. G.R.

Revised: 10/29/44

0209 TOP 200. Re-arranged air support programme for 2 Aug. Fighter Bomber targets. JSE 1
000 in square U1261 approx time H hr. JSE2 0000 in square U1266 approx time H plus 10
mins. JSE3 cluster of woods and farm buildings west half square U0756 approx time H
plus 120 mins. JSE4 village ROMJANOVY 0000 approx time H plus 100 mins. (JSE5) village
OPREKAY LI HARTONKI 0000 approx time H plus 120 mins. 1 hr soon as possible after 12
1200 hrs. 1 BRIT CORPS WILL indicate centre JSE1 and JSE2 with RED smoke at 15
sec interval at ETA notified. WMS will be notified through ASU channels by 1200 hrs.
air support programme will be combined with any programme essential to RAF agreement as
follows. 2 CDN CORPS PARTY with superimposed three PD REGTS of 1 BRIT CORPS JSE1 and
JSE2 time respective ETAS plus 15 mins. 1 BRIT CORPS ARMY JSE3 JSE4 and JSE 5 time ((400))
respective ETAS plus 20 mins. all targets HE scale 5 all times Zone 3

Figure 11: Example of a daily pre-arranged air programme (2 August 1944).

Reproduced above is the pre-arranged air support (abbreviated "sp" in the message) programme for 2 August 1944.¹ This programme would have been finalized at the daily evening air conference at 1st Canadian Army headquarters, 1 August. Note that all of the targets are for very direct support, in the area just south of Caen. At this time, 1st Canadian Army was struggling onto Bourgébus ridge.

For major offensives, pre-arranged direct support would be even more elaborate, spelled out in a detailed "Air programme", and often including heavy bomber support. See for instance the section on Operation GOODWOOD in chapter three.

Impromptu Direct Support

Most calls for air support through the ASSU tentacles, either from normal tentacles, VCPs, or FCPs, resulted in impromptu direct support missions.

On 18 July, a Sherman command tank fitted out as a VCP was employed with the 29th Armoured Brigade of 11 Armoured Division. The RAF controller was wounded early in the battle, but the young Air Liaison Officer, Second Lieutenant P.M. Roberts, carried on and successfully called aircraft down onto several targets, including a concentration of panzers in Bourgébus wood, and some German tanks in Bourgébus village itself.²

Pre-arranged Indirect

Any missions directed against targets at a remove from the front line, which were identified

either in planning conferences for new offensives or at the daily evening air conference at one of the composite group/army headquarters, became pre-arranged indirect missions. For instance, the plan for D-Day included provision for No. 2 Group throughout the hours of darkness prior to the assault, to strike at targets ranging between Caen and Avranches, in an effort to hinder the movement of German reserves.³

However, it was not just the medium bombers which flew pre-arranged indirect air support. Such missions could be and were flown by fighter-bombers. For instance, on 5 July 1944, No. 439 (Fighter-Bomber) Squadron was ordered to attack a small pontoon bridge over the Orne, about five kilometres south west of Caen.

Seven aircraft from this squadron were airborne with 500 lb. bombs fuzed instantaneous and .025 delay. We crossed the lines at Noyers and were immediately fired at by batteries of heavy flak guns. ... We attacked from 6500 ft east to west and prolonged a good steep dive at an angle of 60 degrees to 3000 ft. The bombing was well concentrated around the target, one burst was observed on the eastern approach.⁴

1. NAC RG 24 Vol. 10671 file 215C1.095(D3).
2. Brereton Greenhous et al, *The Crucible of War*, p 312.
3. "Operations Order No. 3", 3 Jun 44, quoted in Michael Bowyer *2 Group R.A.F.* (London: Faber and Faber, 1974), p 368.
4. No. 439 Squadron *Operations Record Book*, Appendix entry for 5 July 1944.

Bibliography

Notes

AHB = Air Historical Branch

DHH = Directorate of History and Heritage.

NAC = National Archives of Canada. NAC citations include the Record Group (RG) number, and the file number within that RG.

PRO = Public Record Office. The British archives at Kew are organized by type and then file numbers. PRO AIR includes most air related files. PRO WO (War Office) includes most Army files.

WO = War Office

Archival Sources: Doctrine and Procedure

Air Support, The Second World War 1939-1945: Royal Air Force Air Ministry: Air Publication 3235, 1955. (originally a classified report)

Army/Air Operations Pamphlet No. 1 General Principles and Organization, (26/GS Publications/1127), 1944.

Army/Air Operations Pamphlet No. 2 Direct Support, (26/GS Publications/1181), 1944.

Air Support and Air Reconnaissance, Aspects of Combined Operations in North West Europe, immediate post-war Army study, PRO AIR 37/881.

Memo "Organization and Employment of 1 Canadian ASSU" 8 March 1944, NAC RG 24 Vol 10671 file 215C1.093(D2)

Memo "Notes on Air Support June-October 1944" November 1944, PRO WO 205/556

Memo "Forward Direction of Aircraft" 16 September 1944, PRO AIR 2/7870.

Memo "Report by CSO 83 Group on the Operation of Signals During 1944" February 1945, PRO AIR 37/333

Memo "Forward Aids to Air Support" 1 September 1944, NAC RG 24 Vol 10671 file 215C1.093.

Memo "Organization of Staffs and Operations Rooms at RAF Composite Group and Army Headquarters" no date, probably September-November 1944, PRO AIR 2/7870.

Plan "OVERLORD: Direct Air Support" (NJC/00/74/41), 23 April 1944, PRO WO 205/182.

Memo "British and American Methods of Air Support" 7 March 1945, PRO WO 205/546.

Text of Address, Air Vice Marshal Dickson to Headquarters 1st Canadian Army, 7 June 1943, NAC RG 24 Vol 10671 file 215C1.093.

Archival Sources: Campaign History

No. 83 Group, *Operations Record Book*, PRO AIR 25/704.

No. 84 Group, *Operations Record Book*, PRO AIR 25/709.

Allied Expeditionary Air Forces (AEAF) Overall Air Plan -- Op NEPTUNE, NAC RG 24 Vol 10400 file 200A2.016(D1).

"Air Support Op CHARNWOOD", 7 July 1944, NAC RG 24 Vol 10913 file 235C3.095(D2).

2 Brit Army Air Request GOODWOOD, NAC RG 24 Vol 10554 file 215B2.013(D1).

Air Programme Op SPRING, 23 July 1944, NAC RG 24 Vol 10800 file 225C2.013(D9).

First Canadian Army Op TOTALIZE Request for Air Support, 4 August 1944, NAC RG 24 Vol 10671 file 215C1.096(D3).

Op TOTALIZE Air Programme, 6 August 1944, NAC RG 24 Vol 10671 file 215C1.096(D3).

AEAF "Report on Air Operations" PRO AIR 27/757.

AHB narrative, *The Liberation of North West Europe Vol IV The Breakout and the Advance to the Lower Rhine, 12 June to 30 September 1944*, PRO AIR 41/67.

AHB narrative, PRO AIR 37/1213.

Official Histories

Ellis, Lionel. F., *Victory in the West Vol I The Battle of Normandy*, London: HMSO, 1962.

Gibbs, H.N. *Grand Strategy*, Volume I, London: HMSO, 1976.

Greenhous, Brereton, Harris, Stephen J., Johnston, William C., Rawling, William G.P. *The Official History of The Royal Canadian Air Force, Volume III: The Crucible of War, 1939-1945* Ministry of Supply and Services Canada, 1994.

Stacey, C.P. *Official History of the Canadian Army in the Second World War, Volume III, The Victory Campaign: The Operations in North-West Europe, 1944-1945* Ottawa: Queen's Printer, 1966.

St George Saunders, Hilary & Richards, Denis *Royal Air Force 1939-1945 Vol. II The Fight is Won*, London: HMSO, 1954.

Webster, Sir Charles, and N. Frankland *The Strategic Air Offensive Against Germany* London: HMSO, 1961.

Published Sources

Allen, H.R. *The Legacy of Lord Trenchard*, London: Cassell, 1972.

Ambrose, Stephen E. *Citizen Soldiers: The US Army from the Normandy Beaches to the Bulge to the Surrender of Germany, June 7, 1944 - May 7, 1945* New York: Simon & Schuster, 1997.

Balkoski, John *Beyond the Beachhead: The 29th Infantry Division in Normandy* New York: Stackpole Books, 1999.

Bennett, Ralph *ULTRA in the West, The Normandy Campaign 1944-45* New York: Charles Scribner's Sons, 1979.

Berger, Monty & Street, Brian Jeffery *Invasions Without Tears* Toronto: Random House Canada, 1994.

Bidwell, Shelford, and Dominick Graham *Fire-Power: British Army Weapons and Theories of War 1904-1945* London: Allen and Unwin, 1982.

Bond, Brian *British Military Policy Between the Two World Wars*, Oxford: 1980.

Boog, Horst, (editor) *The Conduct of the Air War in the Second World War* Oxford: Berg Publishers, 1992.

Bowyer, Chaz; Reed, Arthur; and Beamont, Roland *Mosquito Typhoon Tempest at War* London: The Promotional Reprint Company, 1997.

Bowyer, Michael *2 Group RAF* London: Faber & Faber, 1974.

Bryant, Arthur *The Turn of the Tide 1939-1943: A Study Based on the Diaries and Autobiographical Notes of Field Marshal The Viscount Alanbrooke, F.G. O.M.* London: Collins, 1957.

Carrington, Charles E. *Soldier at Bomber Command*, London: Leo Cooper, 1987.

-----, "Army/Air Cooperation, 1939-1943" *RUSI Journal*, December 1970, pp 37-41.

Churchill, Winston S. *The History of the Second World War Vol III The Grand Alliance*, London: Cassell, 1950.

Coningham, Air Marshal "The Development of Tactical Air Forces" *RUSI Journal* Vol. XCI No. 562, May 1946, pp 211-226.

Cooling, B.F. (editor) *Case Studies in the Development of Close Air Support*, Washington: Office of Air Force History, 1990.

Copp, Terry "From the Editor" *Canadian Military History* Vol. 7 No. 4 Autumn 1998.

Davies, J. and Kellet, J.P. *A History of the RAF Servicing Commandos*, Shrewsbury: Airlife Publishing, 1989.

De Guingand, Major General Sir Francis, *Operation Victory*, London: Hodder and Stoughton, 1947.

D'Este, Carlo *Decision in Normandy* London: William Collins Sons & Co. Ltd., 1983.

Douhet, Giulio *The Command of the Air* translated by Dino Ferrari, New York: Coward-McCann, 1942.

Ellis, John *Brute Force* London: Andre Deutsch, 1990.

English, John A. *The Canadian Army in the Normandy Campaign: A Failure in High Command* New York: Praeger, 1991.

Evans, Christopher *Tactical Air Power in the Normandy Campaign: The Role of 83 Group* Wilfred Laurier University, unpublished MA thesis, 1998.

Fraser, David, *And We Shall Shock Them: The British Army in the Second World War*, London: Hodder & Stoughton, 1983.

Golley, John, *The Day of the Typhoon: Flying with the RAF tankbusters in Normandy*, Wellingborough: Patrick Stephens, 1986.

Gooderson, Ian, *Air Power at the Battlefield: Allied Close Air Support in Europe 1943-45*, London: Frank Cass, 1998.

Hallion, Richard P., *Strike From the Sky*, Washington: Smithsonian Institute Press, 1989.

-----, "Battlefield Air Support A Retrospective Assessment" *Airpower Journal*, Spring 1990, pp 8-28.

Hamilton, Nigel Monty, *Volume 2: Master of the Battlefield 1942-1944* London: Hamish Hamilton, 1986.

Harris, Sir Arthur, *Bomber Offensive*, London: Collins, 1947.

Hastings, Max *Bomber Command* New York: 1979.

---- *Overlord: D-Day and the Battle for Normandy, 1944* London: Pan, 1984.

Higham, Robin *The Military Intellectuals in Britain: 1918-1939* New Brunswick NJ: Rutgers University Press, 1966.

Houlton, Johnnie, with John Murray, *Spitfire Strikes: A New Zealand Fighter Pilot's Story*, London: John Murray (Publishers) Ltd, 1985.

How, J.J., *Normandy, The British Breakout*, London: 1981.

Hyde, H. Montgomery *British Air Policy Between the Wars 1918-1939*, London: Heinemann, 1976

Jacobs, William A., "Tactical Air Doctrine and AAF Close Air Support in the European Theater, 1944-1945" *Aerospace Historian* Vol. 27 No. 1 March 1980.

-----, "Air Support for the British Army, 1939-1943" *Military Affairs* Vol. XLVI No. 4, December 1982, pp 197-182

-----, "The Battle for France, 1944" pp 237-293 in *Case Studies in the Development of Close Air Support* ed by B.F. Cooling, Washington: Office of Air Force History, 1990.

Jarymowycz, Roman "Canadian Armour in Normandy: Operation Totalize and the Quest for Operational Manoeuver" *Canadian Military History*, Vol. 7 No. 2 Spring 1998, pp 19-40.

Johnson, J.E. & Lucas, P.B. *Winged Victory: Reflections of two Royal Air Force Leaders* London: Stanley Paul, 1995.

Kastenuk, Samuel & Griffin, John *RCAF Squadron Histories and Aircraft, 1924-1968* Toronto: Samuel Stevens Hakkert & Co, 1977.

Keegan, John *Six Armies in Normandy* New York: 1982.

Kennett, Lee "The US Army Air Forces and Tactical Air War in the Second World War" in *The Conduct of the Air War in the Second World War* edited by Horst Boog Oxford: Berg Publishers, 1992.

- Larson, Robert H., *The British Army and the Theory of Armoured Warfare, 1918-1940*, Newark: University of Delaware Press, 1984.
- Luvaas, Jay, *The Education of an Army: British Military Thought, 1815-1940*, Chicago: University of Chicago Press, 1964.
- MacMillan, N. *The Royal Air Force in World War, Volume IV: 1940-1945 (II)* London: George G Harrap & Co., 1950.
- Mason, Air Vice Marshal R.A. *Air Power: An Overview of Roles*, London: Brassey's Defence Publishers, 1987
- Milberry, Larry & Halliday, Hugh A. *The Royal Canadian Air Force at War, 1939-1945* Toronto: Canav Books, 1990.
- Overy, R.J. *The Air War, 1939-1945* New York, Stein and Day, 1980.
- , *Why the Allies Won* London, Cape Publishers, 1995.
- Philpott, Bryan *RAF Fighter Units Europe 1942-45* London: Osprey, 1978.
- Powers, Barry D., *Strategy Without Slide-Rule*, London: Croom Helm, 1976.
- Price, Alfred "The 3-inch Rocket" *RAF Quarterly* Summer 1975, pp 127-131.
- Robertson, Scot *The Development of RAF Strategic Bombing Doctrine, 1919-1939* Westport CT: Praeger, 1995
- Rostow, W.W. *Pre-Invasion Bombing Strategy: Eisenhower's Decision of March 25, 1944*. Austin, University of Texas Press, 1981.
- Saward, Dudley *Victory Denied: The Rise of Air Power and the Defeat of Germany 1920-45*, London: Buchan & Enright, Publishers, 1985.
- Schulman, Milton *Defeat in the West* London: 1948.
- Shores, Christopher F. *2nd TAF* London: Osprey, 1970.
- , *Ground Attack Aircraft of World War II*, London: Macdonald & Janes, 1977.
- Slessor, Sir John C. *Air Power and Armies*, London: Oxford University Press, 1936.
- , *The Central Blue*, New York: Frederick A. Praeger, 1957.
- Smith, Malcom *British Air Strategy Between the Wars*, Oxford, 1984.

Smith, Peter C. *Close Air Support: An Illustrated History 1914 to the Present*, New York: Orion Books, 1990.

Speidel, Hans *Invasion 1944: Rommel and the Normandy Campaign* Chicago: 1950.

Spires, David "Air Power for Patton's Army: The Role of XIX TAC" *Air Power History* Vol. 41 No. 2 Summer 1994, pp 38-48.

Sweetman, Bill "Spitfire" in *The Great Book of World War II Airplanes* New York: Wing and Anchor Press, 1984, pp 269-316.

Syrett, David, "The Tunisian Campaign, 1942-43" pp 153-189 in *Case Studies in the Development of Close Air Support* ed by B.F. Cooling, Washington: Office of Air Force History, 1990.

Tedder, Lord, *With Prejudice* (London: Cassell, 1966

Terraine, John *The Right of the Line: The Royal Air Force in the European War, 1939-1945*, London: Hodder & Stoughton, 1985.

Thetford, Owen *Aircraft of the Royal Air Force Since 1918* London: Putnam & Company, 1979 edition.

Townsend Bickers, Richard, *Air War Normandy* London: Leo Cooper, 1994.

Williamson, Murray, *Luftwaffe*, London.

Wilmot, Chester, *The Struggle for Europe*, London: Collins, 1954.

Winton, Harold, *To Change an Army: General Sir John Burnett-Stuart and British Armoured Doctrine, 1927-1938*, Lawrence, Kansas: University Press of Kansas, 1988.