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Flights of Fancy:
The Misuse of Analogies and British Planning for Strategic Bombing in the Interwar Period

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Abstract:
From fending off Gotha bombers and Zeppelins over London during World War I to policing colonial dominions from the air, the British gained a lot of experience with aerial warfare prior to World War II. In contrast, the United States had relatively little experience in the air. Whose air force was better prepared to conduct strategic warfare in World War II? It turned out to be the Americans.

Britain's abundance of experience helped lead them astray. It gave them a menu of lessons upon which to base their planning, and they chose the wrong analogies. In contrast, the Americans ended up with better bombers and better bombing doctrine in part because they were inventing their planes and plans from the ground up, without so many misleading analogies to distract. I argue that in some cases too many available analogies can be a bad thing, and can exacerbate the pathologies of organizational and bureaucratic politics.

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Introduction

From fending off Gotha bombers and Zeppelins over London during World War I to policing colonial dominions from the air, the British gained a lot of experience with aerial warfare prior to World War II. In contrast, the United States had relatively little experience in the air. Whose air force was better prepared to conduct strategic bombing in World War II? Oddly enough, it turned out to be the Americans.

When World War II started, the test of combat forced Britain to change its overall strategy and doctrine more often and to a greater degree than the U.S. The British switched from precision day bombing to precision night bombing to night area bombing, all the while using relatively small bombers. The U.S. persevered with precision day bombing, but switched from unescorted to escorted bombers. Given the organizational similarities between the two air forces and Britain's more extensive experience, why was Britain less prepared for strategic bombing than the U.S.?

Ironically, Britain's abundance of experience helped lead them astray. It gave them a menu of lessons upon which to base their planning, and they chose the wrong analogies. In contrast, the Americans ended up with better bombers and better bombing doctrine in part because they were inventing their planes and plans from the ground up, without so many misleading analogies to distract. I argue that in some cases too many available analogies can be a bad thing, and can exacerbate the pathologies of organizational and bureaucratic politics.

This analysis makes several contributions. First, while the literature on analogies covers many of the ways analogies may be used, relatively little work has been done on how they are selected in the first place. I borrow from the literatures on organizational politics and the causes

of war to help explain why the British chose as they did. Second, the argument that the Americans used analogies less than the British because they had a less rich historical experience from which to draw counters the argument that unprecedented situations create ripe conditions for analogizing (Houghton, 1996). Instead, this analysis suggests nearly the opposite: a deep and diverse history provides fertile ground for selective analogizing.

Third, some believe that the most important role of analogies is to help decision-makers choose between options (Khong, 1992:9-10), what I call the informative role of analogies. However, I also show that analogies are also important when used in instrumental roles to justify and debate policies. For example, we see British military leaders using different analogies in their debates over the proper roles of the British bomber force. Scholars of analogical reasoning recognize these instrumental roles, but tend to downplay them. As analogies are laid out and debated, they become reinforced. There is feedback between the informative and instrumental roles of analogies, which is another reason the latter role should receive more attention.

In the rest of this article, I summarize the literature on analogies and lay out different mechanisms by which analogies affect decision making. I then review the development of British and American strategic bombing weapons and doctrine in the interwar period. I compare these preparations, highlighting the role of faulty analogizing in the British case and the fresher approaches taken by the Americans. I conclude by discussing the implications of this analysis for scholars in political psychology and for policy makers.

Theorizing about Analogies and Historical Lessons

Analogies

Learning from the past is normal and necessary, and often it is straightforward and direct. For example, when I was dating I relied on learned cues to help differentiate women from men.

Great inefficiencies would result if people had to think through these sorts of basic categorizations at every turn (Jervis, 1968).However, when there is greater uncertainty, it is harder to characterize situations or formulate options. Analogies are boiled down, shorthand lessons from history. As such they are a tool policy makers use to confront uncertainty. Analogies help make tougher and more indeterminate categorizations, and help shape reactions to political problems. To make and use an analogy, policy makers find past situations with similarities to a current problem, and they apply the lessons from the past to the existing problem. For example, a driving analogy of the Cold War was that of Munich where the conventional wisdom is that the West made concessions to Hitler's Germany that led to World War. The analogy is that if failure to deter at Munich only whetted the appetite of a expansionist authoritarian power, then the West must stand firm to prevent expansion by the Soviet Union.

Yuen Foong Khong defines an analogy as an "inference that if two or more events separated in time agree in one respect, then they may also agree in another." As he depicts it: AX:BX::AY:BY. In other words, if the problems of World War II (A) and the Cold War (B) share the common factor of totalitarian expansion (X), then not appeasing (Y), which was the lesson from World War II, should apply to the Cold War (Khong, 1992:7).

The trick with analogies lies in selecting the right ones and applying them usefully. Lots can go wrong. The bulk of the literature on analogies examines the different ways analogies are applied, and often focuses on identifying various pathologies that arise in the selection and misapplication of analogies (Khong 1992; May 1973; Neustadt and May 1986; Vertzberger 1986). Analogies are just one of a number of cognitive lenses, biases, and filters that people bring to bear in decision making. Others include evoked sets, schemas, and operational codes, but analogies are the most explicitly historical (McDermott, 2004; Sears, et al., 2003).

There is little consensus on the different ways analogies can be used. For example, Khong says that analogies can help define the nature of the situation that the policymaker faces, help assess the stakes involved, and provide prescriptions. In addition, they can help evaluate alternative options by helping predict the chances of success, and evaluate their moral rightness (1992:10). Vertzberger lists four functions of history: to define the situation, to circumscribe roles (of actors in the international system), to determine strategy, and to justify strategy. Each of these functions has a number of subcategories (1990:298-308). In short, analogies can cause policy and/or justify policy at almost any step in the policy making process where choices must be made: agenda setting, option formulation, decision making, and implementation.

This is no surprise. The search for the proper analogies is part of the larger search for better and more complete information which is part of almost any decision making process. As decisions about public policy are about the future, they is always uncertainty. Uncertainty can be heightened by time pressures, crises, and other factors – all of which increase the utility of analogies (Houghton, 1998; Levy, 1994). In arguments that can readily be applied to analogies, Goldstein and Keohane write that ideas can serve as roadmaps to help individuals determine their own preferences and as focal points in situations where multiple equilibria exist (1993).

Critics of analogies argue that analogies are merely post-hoc rationalizations and justifications of policy (Levy, 1994; Khong, 1992:8). The counter is twofold. First, there is persuasive evidence showing that analogies have a causal role in policy making. Gentner and Holyoak claim that the twenty-year old research program on analogical reasoning is a "major 'success story' in the interdisciplinary field of cognitive science" (1997:32; Bowdle and Gentner, 2005). Having an analogy in mind can even change perception and cause misperception (Blanchette and Dunbar, 2002; Mitchell, 1993).

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Second, by arguing that analogies are irrelevant or are of secondary importance just because they serve as justifications or are post-hoc, critics of analogies pose a false dichotomy, which many scholars of analogies seem to accept. In any ongoing policy process where policies are debated and refined, justifications for policies also shape policies. Even if an analogy was not used in the very first reaction by a policy maker, the first formulation of a policy debate, or in an initial decision does not mean that it will not shape beliefs and perceptions later on. This argument is reinforced by a small but growing literature in international relations that is devoted to the role of argumentation and debate in shaping beliefs and policies (Crawford, 2002; Risse, 2000). Analogies can help decision-makers choose between options, but they can also help firm up a decision or inclination, and they can help persuade.

In sum, analogies have an informative role if they help decision makers categorize or characterize situations, or if they help them choose between options. Analogies have an instrumental role when they are used to justify, reinforce, or debate policies. Categorizing analogies into these two roles helps distinguish between the initial and post-hoc uses of analogies, while also helping make the point that post-hoc uses of analogies can be important.

The weakness of the categorization is in the iterative or feedback-laden nature of decision making (Jervis, 1997). Even within individuals, it is not necessarily easy to distinguish between trying to make a decision and choose a policy and trying to justify that policy. This difficulty is compounded when decisions are made by groups and organizations. However, the instrumental importance of analogies is increased by these feedback and iterative reinforcement mechanisms.

Organization Theory

Faced with a policy problem, decision makers may have many analogies to choose from. Moreover, the meaning of each analogy or historical experience is often open-ended, diverse, and

sometimes contradictory. When looking at the Iraq War, is the lesson of Vietnam for the U.S. to stay the course or to leave earlier? With respect to bombing, the British could have looked to their success in turning back Gotha and Zeppelin bombers and concluded that defense works and that offensive and coercive airpower ends up being ineffective. Or they could have seen the great effects achieved by their coercive use of air power in the colonies and concluded that they should devote more resources to the air. It is also true that one analogy can help make a decision, while another analogy can be used as counterarguments to alternatives (Stapel and Spears, 1996). Given a certain level of indeterminateness, which analogy ends up being employed is a function of its merits, and also of prior preferences and interests (Peterson, 1997).

To help establish what these prior preferences might be for the British and American air forces, I turn to organization theory, buttressed with theories from the causes of war literature on optimistic miscalculation. As I am examining organizations and actors within organizations, organization theory is appropriate for this level of analysis. It is also the logical choice for examining decisions about weapons and doctrine, as demonstrated by the large literature which does exactly that (Brown, 1992; Rosen, 1988; Sapolsky, 1972). Regarding precedent, Houghton also pits analogies against the organizational/bureaucratics politics model (1996). Had I wanted to look at overall resource allocation across service branches or civilian intervention, other theories such as balance of power would also be appropriate for inclusion (Posen, 1984).

The first and most important argument in the organizational literature is that organizations seek survival, autonomy, and wealth. To accomplish this they differentiate themselves from competitors and establish demands which they are uniquely qualified to satisfy. Organizations lobby for their own interests in bureaucratic and policy debates. Second, organizations prefer offensive doctrines because offensive operations require more resources,

offense allows the organization better control over its environment, and offense is more likely to provide a theory of victory which assists in establishing functional differentiation. Third, organizations are more conducive to innovation when they are decentralized, have less formal institutionalization and standard operating procedures and have slack or resources to devote to innovation. They are motivated to innovate by failure, competition with other organizations, or intervention by higher authorities. Innovation also tends to occur in organizations containing strong-willed, risk-taking individuals (Allison and Zelikow, 1999; Katzenbach, 1988; Posen, 1984; Wilson, 1989).

Preferences for the offense are reinforced by the optimism that often pervades states prior to launching wars (Blainey, 1988; Snyder, 1984; Van Evera, 1984; Van Evera, 1999). While neither the British nor the Americans started World War II, arguments about optimistic miscalculation do seem to capture the overall ebullience for strategic bombing that gripped some air power theorists like Giulio Douhet in the interwar period (McFarland, 1995:78). In addition, it is a natural function of competitive bureaucratic politics that organizations make optimistic claims about the effectiveness with which they can carry out their missions. Table 1 summarizes these arguments:

Table 1: The Roles of Analogies and Organization Theory

Analogies	+	Organization Theory
Informational Uses: - categorize and characterize a situation - choose between options		*Organizations prefer:* - survival, autonomy, wealth - offensive doctrines
Instrumental Uses: - justify policies - solidify and reinforce policies - debate policies		*Organizations tend towards:* - (excessive) optimism

Do prior preferences obviate the role of analogies, and am I accidentally confirming the

skeptics' view that analogies are merely post-hoc window dressing? Prior preferences and analogies work together, sometimes being mutually reinforcing, and sometimes working against each other (Hemmer, 1999; Holyoak and Thagard, 1997). If prior interests dictated decisions, there would be fewer periods of uncertainty, less agonizing, and less role for persuasion within and between decision-makers. Not only do analogies and organization theory work together, each fills in where the other is indeterminate in this analysis. The British had many analogies from which to choose, so why did they go for offense dominance? Organization theory helps answer that. What explains why the British and Americans had different outcomes despite similar organizations and preferences? Analogies. The British had many on their menu, chose the wrong ones, and ended up with flimsy doctrine and bombers.

Observable Implications

To prove my arguments, the case studies must first show that the British and American experiences with air power in WWI and the interwar period varied in both breadth and depth. The British racked up much more experience, and in different contexts, than the Americans, and this gave them more analogies and historical lessons from which to choose. Next, these historical variations must inform the analogies drawn on by the British, and we should see these analogies brought out in policy debates and in the development of strategic doctrine. The analogies chosen will tend to reflect the preferences and tendencies of organization theory. Analogies can help categorize and characterize problems, and make, solidify, justify, and debate choices. These are the effects I will look for in the case studies.

In theory, the cases should also show that U.S. developments in interwar strategic bomber weapons and doctrine were relatively free of or unguided by analogies. However, this means trying to prove a negative – a difficult task. For this reason, I focus less on the U.S. side.

However, the case nonetheless shows a more analytical side to U.S. preparations, a viewed confirmed by numerous other scholars. As such, the American case contrasts with the British and helps demonstrate the extent to which Britain's preparations skewed. The British case alone serves to show how the British used and abused their available lessons and analogies.

The final part of my argument rests on making that case that the Americans were better prepared for strategic bombing than the British. Two criteria to help judge the quality of readiness. The first is how closely execution of the bombing campaigns matched each country's expectations. The second is, with hindsight, the wartime effectiveness of each campaign.

Case Selection

These cases are quite similar, except in their study variables - prior history with bombing, and effectiveness of WWII bombing, thus they come close (for the real world) to satisfying Mill's "method of difference" (1987:68). Britain and the U.S. shared many macro level factors from language to democracy. The cases are also similar with respect to bureaucratic and organizational politics. Both the American and British air forces were small, financially and bureaucratically embattled, and spent the interwar years advocating and preparing for strategic air warfare. A strong bias existed in much of each country's air force towards offensive bombing and destruction of an enemy's capacity and will to fight.

These similarities deepen the puzzle about why the British were less well prepared because organization theory at this basic level of organizational preferences would tend to predict the same outcomes. One striking variance in the cases is Britain's richer history, which led to confusing lessons, and which counterproductively amplified offensive optimism. The similarities and contrasts between the cases help the independent influence of analogies stand out.

Case Studies

The cases show that events such as the bombing of London and air control in Britain's colonies were the basis of selective, overblown, and feeble analogies. For example, policy-makers used the bombing of London to create exaggerated and apocalyptic predictions about strategic bombing that simultaneously bolstered the role of the Royal Air Force while creating complacency and illogical doctrine within it. Successes in the colonies seemed to bolster the arguments of air power enthusiasts, but lessons drawn from air control in colonies turned out to have little to do with fighting advanced industrial powers. Rational assessment of strategy and doctrine was hindered by Britain's complex and emotionally-charged history.

In contrast, American cities were not bombed in World War I and the U.S. flew far fewer combat air operations than the British in both WWI and the interwar period. Yet in preparing for strategic bombing, the U.S. Army Air Forces conducted more realistic testing of weapons and theories and formulated a more sophisticated strategy of victory than their British counterparts.

OVERVIEW: COMPARING AMERICAN AND BRITISH AIRPOWER EXPERIENCES IN WWI

Levels of pre-war readiness foreshadowed the stark contrast in British and American operations during WWI. In 1913, before the war started, Britain's aeronautical appropriations were $3,000,000, fourth behind France with $7,400,000 and Germany and Russia with $5,000,000 apiece. U.S. appropriations were $125,000. In 1914, the U.S. had 6 aircraft and 14 pilots available, while Britain had 29 and 88 respectively (Holley, 1953:29).

World War I began in August, 1914 and ended with the armistice in November, 1918. The U.S. missed most of the war, and entered in April, 1917. The British quickly got into its air war, and had bombed military targets in Dusseldorf and Cologne by September, 1914 (Fabyanic, 1976). By the end of the war, Germany had sent 103 bombing raids to England, killing 1413 and injuring 3407 (Longmate, 1983:21). Airplanes from combatants could not reach America, so the

U.S. had no direct experience being bombed or defending against bombers, nor did it have to give serious thought to the possibility.

Britain ended WWI with 300,000 men in the Royal Air Force (RAF) while the U.S. ended with 78,000 men serving overseas in the Air Service (and 112,000 serving in the U.S.) (Maurer, 1987:5; Stokesbury, 1986:115). Over the course of the war, Britain produced 58,000 planes and ended the war with 22,000 (Stokesbury, 1989:143). The U.S. produced 3,500 planes but ended with only 740 at the front at the time of the Armistice (Mason, 1976:46; Greer, 1985:4; Stokesbury, 1986:103; Mauer, 1978:17). Britain used its planes in a more even mix of roles. In 1918, 55% of its planes were fighters, 23% were observation, and 22% were bombers. The U.S. percentages were 46.5%, 46.5% and 7%, respectively (Holley, 1998:163). Britain's newly formed Royal Air Force dropped 543 tons of bombs between the seven months of June and November 1918 alone, of which 220 were on German aerodromes. In contrast, American bombers dropped 138 tons during the seven months they were in action (Tress, 1988:42; Saundby, 1961:21; Webster and Frankland, 1961:41,48). Of the 55,000 airmen killed in WWI, Britain had lost 30,000 and America 237 (Mason, 1976:73; Stokesbury, 1986:112). In every measurable dimension, the British gained much more experience with air power during WWI.

BRITAIN, AIR POWER, AND WORLD WAR I

This section develops in more detail the British experience in WWI, showing that their defenses prevailed against German offenses. This lesson was ignored in the inter-war period as the British air force came to believe in the superiority of the offense.

During the war, the Germans bombed England during the day and night and, they tried to hit specific military and economic targets, as well as conduct an area/terror bombing campaign. The first of fifty-one Zeppelin raids against Britain occurred on the night of January 19, 1915

when two airships dropped several 110 pound bombs and 6.5 pound incendiaries on civilian areas of three towns causing a total of five deaths and over fifteen injuries. Under strict orders from Kaiser Wilhelm to limit bombing to military targets, Zeppelin crews felt compelled to report that they had destroyed ammunition dumps and battleships (Cross, 1987:19-30; Johnson and Cozens, 1984:14; Kennett, 1982:22-24; Wragg, 1986:34). The Kaiser then consented to attacks on greater London where twenty-five percent of Britain's population lived (Webster and Frankland, 1961:50). The Zeppelins delivered 196.5 tons of bombs, killed 557 people and injured 1,358 while causing £1.5 million in damage (Cross, 1987:30). Britain had early difficulties defending against the Zeppelins and succeeded in damaging only one of the thirty-seven Zeppelins that attacked in 1915 (Hough and Richards, 1989:9). Sporadic Zeppelin attacks continued through 1918 but by late 1916, the raids were essentially halted by steadily improving British fighters and attacks on Zeppelin sheds in Belgium (Johnson and Cozens, 1984:15-16).

Beginning as daylight attacks on May 25, 1917, German raids by Gotha bombers were the next big shock to the British. Two raids struck London by early July. Despite German attempts to find and bomb military targets, the attacks killed 219 Londoners and injured 625. As with the Zeppelins, early air defense efforts were often futile. It was common to send up 60-90 fighters to defend against an attacking squadron and obtain results ranging from one Gotha downed to failure to intercept at all (Webster and Frankland, 1961:34-35; Stokesbury, 1986:87; Cross, 1987:44). Day raids continued through August, 1917 when increasingly strong defenses forced the Germans to attack at night to limit attrition (Hough and Richards, 1989:11). Along with new fighters like the Sopwith Camel, the British also developed the ability to fly effectively at night. After eight day and nineteen night raids, the Gotha attacks ended in May, 1918 after having killed 800 and injured 2000 (Gunston, 1976:7; Wragg, 1986:41-42; Kennett, 1982:25-26; Cross,

1987:47-52; Webster and Frankland, 1961:41-42; Hough and Richards, 1989:11).

The immediate impact of the bombings on morale, production, and war effort was more superficial than substantive. At the time though, the bombing raids were unprecedented, and they shocked the British. This set the stage for conflicting analogies. Proponents of offensive bombing recalled the shock and awe. Critics, more accurately, downplayed the effects of bombing.

Effects of the Bombing Raids

Bombing caused short-term alarm, but did little to damage morale. Attacks on London led as many as one-third of a million residents to flee to shelters or out of London altogether during raids and alerts. This maximum figure was only five percent of the greater London population (Kennett; 1982:25-26; Hough and Richards, 1989:12). "Gotha panic" reached a peak during an attack on July 7, 1917, causing riots against stores owned by people with German names, press denunciations of government failure, and "words of rare violence in parliament" (Longmate, 1983:21,27; Kennett, 1982:25). The Government may have panicked than the public (Sherry, 1987:14). A frightened Cabinet met following the July 7 raid and Sir William Robertson, Chief of the Imperial General Staff, noted that "one would have thought the whole world was coming to an end" (Dean, 1979:20). However, the attacks also stiffened resistance and led to calls for both reprisals and defense.

From the start then, several options emerge: one can respond to aerial attacks by defense or by offense. Of course, they are not mutually exclusive, and may be mutually reinforcing – if planned right. As later planning for strategic bombing proceeded though, much more faith was put on the offense, and lessons about the defense were left aside.

An October 1917 memo to the Cabinet from Winston Churchill, Minister of Munitions, outlines the effect of bombing on British industrial production. On the night of a severe raid,

munitions production would fall to one-fifth, rising to one-quarter the next day. A minor night raid would reduce production by more than one-half. High absenteeism - not poor morale or damaged equipment - caused most of the short-lived declines. Physical damage was rare because of the combination of low bomb weights and inaccuracy. In the memo, Churchill hoped that equivalent bombing of Germany would produce similar effects (Tress, 1988:39-43). However, in October, 1918, Churchill wrote:

> In our own case we have seen the combatant spirit of the people roused, and not quelled by the German raids. Nothing that we have learned of the capacity of the German population to endure suffering justifies us in assuming that they could be cowed into submission by such methods, or, indeed, that they would not be rendered more desperately resolved by them (Longmate, 1983:32-33).

In retrospect, this will turn out to be a sober and accurate assessment, but it is yet another lesson that ends up being forgotten. Unfortunately, there was enough panic for this to be the lesson adopted by future planners of strategic bombing.

History created many lessons for the British, and many of these lessons were contradictory. Instead of thinking analytically about the puzzles posed by history, the British all too often chose the wrong lessons. Had there not been these analogies and lessons out there, more analytic thought might have prevailed. Even though the analogies selected did reflect preferences, they also reflected sufficient history that they could not be casually dismissed. Hence, even largely incorrect analogies held the power to inform and persuade.

One consequence of German bombing on the British war effort was the diversion of fighters and anti-aircraft guns from the Western front (Tress, 1988:43). Although the number of diverted fighters only represented about one-half of one percent of Britain's total wartime production of planes, the costs of defense exceeded that of the offense and this shows how the offense and defense are related (Smith, 1984:54; Webster and Frankland, 1961:44-45).

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One issue, therefore, is how well planners thought through this offense/defense relationship and whether bombing could achieve direct attrition or coercion goals through offense, or indirect goals of resource diversion. Churchill was skeptical of achieving attrition goals, but many thought bombing would achieve direct attrition and coercion goals, and proponents of strategic bombing downplayed the resource diversion benefits of bombing. They did not want to think through the implications of having to deal with defenses. If they had, they might have realized that defenses eventually worked, despite their cost.

The relative – but still modest – success of aircraft on the battlefield makes the advocacy of strategic bombing even harder to understand, although looking at motivated selective analogizing helps. As noted, tactical missions including observation, close air support and battlefield air interdiction, and air superiority missions were the largest consumers of air power resources in WWI (Holley, 1983:163).

During WWI two of the greatest future proponents of strategic bombing, Sir Hugh Trenchard, head of the Royal Flying Corps (RFC) and Billy Mitchell, Chief of Air Service, 1st U.S. Army, were enthusiastic practioners of tactical missions (as was (Mason, 1976:63-65; Sherry, 1987:19-19; Webster and Frankland, 1961:40-42; Tress, 1988:41). To see how their thinking evolved, and show what experience and lessons were submerged on the tactical side I focus on the statements and views of these two leaders in my cases.

The frequent stalemates on the ground during WWI put a premium on gathering intelligence and spotting for artillery, and these were the most important and successful missions for tactical air power during WWI. Much aerial combat focused on gaining command of the air, the primary benefits of which were to allow one's own reconnaissance planes to fly, and to deny that ability to the enemy (Murray, 2002:79). In the course of WWI, possession of air superiority

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see-sawed several times as a result of technological and doctrinal innovations (Hallion, 1989:19-38; Livesey, 1989:136; Sherry, 1987:16; Kennett, 1982:46-47; Stokesbury, 1986:34; Dean, 1979:11). In the close air support and battlefield air interdiction (CAS/BAI) roles, air power had mixed results influencing the course of trench warfare, as trenches provided good cover, and aircraft could not compete with artillery in terms of tonnage of munitions delivered aircraft. During tactical missions, losses of planes and crew were high (Kennett 1991).

A key lesson that should have been learned was the primary importance of command of the air. Command of the air means suppressing enough of the enemy's aircraft and anti-aircraft assets, to give your own airplanes freedom to operate. Without this freedom, other uses of the air such as observation, spotting, strafing, and bombing become hampered or impossible. As it turned out, both the British and Americans downplayed this lesson, though much more egregiously on the British side. Indeed, it was because the ground battles were so bloody and costly for the British that some like Trenchard sought to avoid the ground altogether through the use of aerial strategic bombing (Biddle, 2002:70).

Britain and Interwar Air Control in the Colonies

The second historical experience that influenced Britain's preparations for strategic bombing was air control in the colonies during the interwar period. Air control is the use of air forces to control local colonized populations, rebels, and so forth. Air control began in May of 1919, thirteen months after the RAF gained its independence. When Afghanistan attacked Indian border areas, the British response included 4 squadrons of BE2c bombers. In one case, the bombers helped turned back tens of thousands of tribesmen who were threatening an brigade of British and Indian soldiers. According to a British Army report on the war, the bombing of Afghan cities and towns "'were factors which probably decided the Amir to sue for peace.'" On

the other hand, the report also cautioned against drawing lessons based on the use of "obsolete and worn out" planes (though this might only reinforce the value of new and more capable planes). Although air power was not always decisive, and reconnaissance proved difficult in the mountainous terrain, airpower was successful enough to make the Afghan precedent helpful to the newly minted RAF in future budget battles (Hallion, 1989:59; Hoffman, 1989:4,34).

Following its initial foray into air control in the Afghan War, the British used air control again in Somaliland, Iraq, Aden, Transjordan, Palestine, Ireland, and India. In Iraq, air power suppressed rebellions and helped defeat Turkish raids (Hoffman, 1989:12,17). Air Vice Marshal Sir John Salmond's use of air control in Iraq lowered the cost of policing from an initial Army estimate of £20 million to £8 million. Air power defeated various tribal uprisings in Transjordan and Aden, and, in Aden, the savings compared to ground units was £35,000 (Smith, 1980:24,29).

There were limits to air control. The greater population density and urban geography of Palestine limited strafing, the countryside of Ireland made it easy for targets to hide if they were not moving, and India's great size hindered air operations (Hoffman, 1989:19-20). Air control often worked best when accompanying ground operations (Corum and Wray, 2003:64-65).

Chief of the Air Staff Trenchard used air control to demonstrate the RAF's viability. In the course of proving it could assist with or perform air control and save lives and money, the RAF fought pitched battles with the Army over both the funds and administration of colonial policing as well as for the continued existence of the independent air force (Smith, 1980:28-31; Dean, 1979:21-23; Hoffman, 1989:4-35). Despite ongoing disputes with the Army, the RAF's successes in air control impressed the Salisbury Committee in 1923. The Salisbury Committee was broadly tasked to assess British grand strategy, and one of its subtasks was to define the strength of the air force. The Committee decided on parity with the Navy and Army for the RAF.

Thus, the Chief of the Air Staff was placed on a newly formed Chiefs of Staff Committee, secured the RAF's stature among the other services, and assuring Chief Trenchard's equality with the Chiefs of the Army and Navy (Webster and Frankland, 1961:53; Dean, 1979:38).

A final reason for the continued influence of air control on British thinking was salesmanship by the RAF, which touted its successes in public fora from reports to journals. These RAF glossed over failures, downplayed the role of ground forces, and led many to give undue credence to the morale and shock effects of bombing. There were skeptics, but the RAF succeeded in creating a "myth" about air control (Corum and Wray, 2003:62-65).

Air control influenced preparations for strategic bombing in WWII for several reasons. First of all, many of the key players in the development of strategic bombing cut their teeth on air control. Arthur "bomber" Harris served with the RAF in India and Iraq and C.F.A. Portal commanded air control operations in Aden. Both led Bomber Command in WWII. With air control, Harris became familiar with "the special characteristics of the new weapons" and he wrote that air patrols "invariably" made insurgents give up (Harris, 1990:21-23). Portal noted air power's morale effects, saying that it could produce a "change of heart" without occupying armies causing large number of casualties on both sides (Portal, 1959:361; Harris, 1990:23).

Second, optimism about air control led to complacency about strategic bombing, even though reasoned analysis would have shown it to be misplaced. For example, air control in the Middle East and India was often performed "in conditions of excellent visibility against no opposition,"but any war in Europe would pit Britain against technological equals in cloudier weather. These difficulties did not deter Trenchard, Harris, and others from using the "air control success = strategic bombing will work in Europe" analogy.

Third, financial strains and political and interservice hostility hindered many necessary

RAF innovations from defenses to offenses, from fighters to bombers. But, the success of air control limited the RAF's demand for innovation in the first place. Specifically, complacency and false optimism retarded development of ordnance design, bombsights, and navigation aids and made tactics against defenses seem unnecessary (Hoffman, 1989:34). Air control created lasting images that prevented learning and adaptation well into World War II:

> ...even in September 1941, after daylight bombing had been largely abandoned, the Directorate of Bomber Operations at the Air Ministry considered that attacking the morale of German civilians by bombing their cities was merely "an adaptation, though on a greatly magnified scale, of Air Control" (Cross, 1987:93).

The RAF did not draw its analogies from the turning back the Zeppelins and Gothas but instead from air control. Lessons based on the successful defense against bombing would have reduced optimism about bombing, and/or led to bigger and better defended bombers.

Lessons Applied: The Evolution of British Strategic Bombing Planning

The effects of WWI on British air power policy and preparations for WWII began in the midst of WWI. Four days after the frightening July 7, 1917 Gotha raid, the Cabinet appointed a committee headed by South African General Jan Smuts to study military responses to the air raids. Smuts was chosen because he was "detached from British internal affairs, political or service" (Tress, 1988:36-37). Quickly becoming "captivated by the vision of air power," Smuts issued his report on August 17, 1917 (Hasting, 1989:38). The report laid the basis for British strategic bombing doctrine. Smuts wrote that the future of war lay in the destruction of enemy industry and population centers. Air power could overcome stagnant and costly trench warfare and subordinate naval warfare as well. The report asserted that "Unlike artillery, an air fleet can conduct extensive operations far from, and independently of, both army and navy. As far as can at present be foreseen there is absolutely no limit to the scale of its future independent use"

(Cooper, 1986:97-107). In the halls of the air power enthusiasts, the Smuts report stood the test of time: when Smuts visited Bomber Command during WWII, Harris showed him the "proofs of the extraordinary accuracy of his prophecy" (Harris, 1989:17).

Smuts adopted Trenchard's doctrine that counter-offensives were the best form of defense and proposed doubling the air forces and creating a strategic bomber fleet. To Smuts, developing the necessary air power expertise required an independent air service and air ministry. These would be assembled by the merging of the Royal Naval Air Service (RNAS) and the Royal Flying Corps (RFC). The Army and Navy protested Smuts' recommendations but their grievous performance in the war lessened the strength of their objections. The government, embarrassed and shocked by the air raids, established the Royal Air Force on April 1, 1918 with Trenchard selected as its Chief. (Webster and Frankland, 1961:37-38). The Smuts report began the crystallization of several patterns which warped the evolution of the RAF. In particular, the offensive mission took on overbearing importance, not only as a basis for doctrine but also as a justification for the existence of the RAF.

To the extent that the need for air defense and air superiority was acknowledged, the doctrines developed for them contradicted both history and reasonable expectations. The official history of Britain's WWII strategic air offensive notes:

> Its [the RAF's] separate identity was, therefore, closely bound up with the plan of a strategic bombing offensive and this very fact tended to make such an offensive the centre of the strategic thinking of the new independent service. As this had provided the main argument for the creation of a separate service, so it was also the main reason for the continued existence of a separate service when, as will be seen, that was again threatened (Webster and Frankland, 1961:38).

Given these turf battles, defenders of strategic bombing had to make strong claims and promises, and tried to back them up with supporting analogies. They found these by selective cherry

picking from their WWI experience, and later by drawing overstretched lessons from air control.

From the beginning, the RAF was not connected to a well thought-out and balanced means-ends chain (Posen, 1984:33). Ideally, strategy consists of means well-matched to achieve desired ends. In the context of air power, this would mean thinking hard about how many bombs of what size it would take to destroy factories, how accurately the bombs would have to be delivered, how best to deliver those bombs on target, what difficulties those deliveries face, and so forth. It may not be fair to hold early RAF plans to that ideal standard, given the strains of war, interservice hostility, and a need for revenge which made political goals trump military planning. Nonetheless, Britain's failures serve as a counterpoint to the conventional wisdom of organization theorists that innovation is most likely during times of wartime or strategic necessity, or following failure (Posen, 1984).

The evolution of Trenchard's views depicts a slide towards irrational offense dominance. In 1915-16, Trenchard, chief of the RFC, believed in the value of first obtaining air superiority before conducting close air support. This was common sensical: if planes have to worry about being attacked, they can not conduct reconnaissance, air support, and other missions (Hallion, 1989:38). Nonetheless, the RFC did not systematically pursue air superiority. While the RFC was skirmishing on the Western front, it was the RNAS that conducted much of the early strategic bombing and counter-air attacks against Zeppelin sheds (Webster and Frankland, 1961:34-36).

Trenchard began to think air superiority was best pursued through offensive counter-air operations in which enemy air bases would be attacked. He deemed air-to-air combat a waste of fighters (Cooper, 1986:48). By 1918, Trenchard headed the new RAF and directed its missions of strategic bombing and reprisal. Trenchard came to resent even offensive counter-air operations as a diversion of resources (Webster and Frankland, 1961:48). To him, the seeming efficiency of

offensive bombing made the use of resources on other missions appear wasteful. Trenchard wrote in 1919 that the morale effects of bombing outweighed material effects by a 20 to 1 ratio (Webster and Frankland, 1961:46). With morale effects so powerful, little thought was given to the specifics of attacking economic or direct military targets, much less gaining meaningful air superiority. As the war ground on, Trenchard increasingly shunned air superiority in favor of what might be called 'unilateral offense dominance,' in which the need to contend for enemy defenses was nearly disregarded. This line of thinking intensified after the war.

In the 1920s, Trenchard and the Air Staff he dominated explicitly cast the best lessons of history aside. The Air Staff noted in 1924 that air forces can try to win with morale effects by bombing military objectives in populated areas from the very beginning of the war, or they can attack aerodromes and hope to achieve air superiority before direct attacks on the nation. They concluded: "The latter alternative is the method which the lessons of military history seem to recommend, but the Air Staff are convinced that the former is the correct one" (Murrary, 1983:325). Such was the optimism about bombing that the Air Staff were willing to proceed apace regardless of whether they could find a way to defeat enemy fighters, or design their own long-range fighters. In May 2,1928 memorandum, Trenchard wrote that:

> "It is not, however, necessary for an air force, in order to defeat the enemy nation, to defeat its armed forces first. Air power can dispense with that intermediate step...penetrate the air defenses and attack direct...[as the war proceeds]...Each will penetrate the defences of the other to a certain degree. The stronger side, by developing the more powerful offensive, will provoke in his weaker enemy increasingly insistent calls for the protective employment of aircraft. In this way he will throw the enemy on the defensive and it will be in this manner that air superiority will be obtained, and not by the direct destruction of air forces.

As illogical as this may sound, Trenchard did his best to draw on the history of the WWI aerial attacks on Britain to support his arguments later in the memorandum:

> Even in the last war...before any of the heavier bombers or bombs had really been developed, the moral effect of such sporadic raids...was considerable.... Each raid spreads far outside the actual zone of the attack. Once raid has been experienced false alarms are incessant and a state of panic remains in which work comes to a standstill. [In one townthat was] attacked only seven times...no less than 107 alarms were sounded and work abandoned for the day (Webster and Frankland, 1961:72,75).

Trenchard is analogizing from the WWI aerial attacks to support his future plans, arguing that 'it was like that then, so it will be even more like that in the future.'

Historical lessons and analogies were also deployed by opponents of Trenchard and his vision for the RAF, and the Army and Navy attacked this memo head on with memos of their own. These various memos provide excellent examples of 'dueling' analogies and historical interpretations. For example, on May 16th, the Chief of the Imperial General Staff, G. F. Milne, responded to Trenchard's memorandum by arguing that:

> ...as the air menace grows...measures will be developed to combat it [and the] issue will be determined by the superiority of one air force over another....in November 1918 approximately 2,000 British and 3,000 French aeroplanes of various types [faced the Germans with] 1,861 machines. Even with this vast superiority there is nothing to show that the necessary paralysis was obtained, and...there is no precedent to show that this has ever been achieved.... no military concentration either by the Germans or by the Allies was ever brought to a standstill by air action....Dunkirk, though systematically bombarded throughout the War continued uninterruptedly... as a subsidiary naval base.... The air raids on London, unpleasant as they were, had no result except to harden the Nation's will to war (Webster and Frankland, 1961:76-83).

In his memorandum of May 21, 1928, the Chief of the Naval Staff, C. Madden, mocked Trenchard's vision of bomber fleets passing each other in midair unmolested, noted that they would certainly be countered, and recalled that the German use of the submarine against civilian boats in WWI helped bring America into the war, and "did not weaken our morale, but tended to stiffen it" (Webster and Frankland, 1961:82).

These debates show that the historical lessons did inform and misinform the policy making process. The fact that historical lessons were in the air and under debate just reinforces how much Trenchard's statements show a strong willingness to adopt some lessons over others, especially in the face of superior counter-arguments. Nonetheless, there was plausible evidence for Trenchard to feel justified and to make his case. This helps demonstrate that availability of analogies can hurt constructive and critical thought. A complex history may help people act according to their predispositions, and it provides ammunition for those willing to use that history selectively or with bias. As shown above, it is hard to separate the informative and instrumental uses of analogies. Trenchard's evolution was complex, as his professional experience, and his organizational and bureaucratic positions and battles, changed over time.

The foundation of Trenchard's argument was that morale effects could win wars. No doubt this in part reflected the RAF's need to functionally distinguish itself from other services by offering a unique theory of victory. However, this does not explain why morale took precedence over economic or military targets. Unless the RAF wanted to admit that it could not bomb accurately or that it was not as moral to bomb for morale, either target set was in theory suited to air force capabilities.

So why was morale the chosen target? This question gets at the heart of selective analogizing, so it is worth exploring in more depth. Britain's WWI history boosted the role of morale targeting for two reasons. The first is that the bombing of England sensitized the populace and its leaders to the dangers of bombing. The second is that the pain of trench warfare made the British vulnerable to and needy of promises of quick and easy victories in the future. Bombing seemed to offer a way to avoid terrible attrition on the battlefront (Biddle, 2002:70; Craven and Cate, 1983:593; Webster and Frankland, 1961:10,49). Both of these were emotionally-charged

lessons, increasing the extent of wishful thinking, and making rational debate harder (McDermott 2004, ch. 6). Strategic bombing promised cheap and devastating power. Faith in morale effects grew, hindered preparations for war, and even contributed to the appeasement of Hitler.

The attacks on London were a point of departure for apocalyptic extrapolations about the future of bombing. As technology improved after WWI, bombing could only become more destructive. In 1925, the Air Staff calculated that a war with France would start with 1,700 bombing deaths in the first 24 hours (Webster and Frankland, 1961:62). This was indeed a frightening estimated escalation from the WWI death rate when it took fifty-one Zeppelin and twenty-seven Gotha raids over the course of the war to kill some 1,400 British. Although a war with France was generally thought of as unlikely, the French threat helped the RAF survive (Tress, 1988:66; Dean, 1979:38). J.F.C. Fuller predicted that bombing London would induce "pandemonium" and "bedlam" and could win a war within two days (Sherry, 1987:24). By 1937, the British Joint Planners estimated that German raids could produce 150,000 casualties in the first week of war. By comparison, the British suffered some 55,000 casualties during the six month long Battle of Britain in 1940, and lost some 3,000 dead during the Battle's single largest raid (Webster and Frankland, 1961:63,66,89). In 1941, Churchill criticized inflated Air Staff damage estimates, noting in a scathing critique that 250,000 beds were allotted for air raid casualties and only 6000 were needed (Churchill, 1950:508).

The alleged morale effects of offensive bombing served the RAF's parochial needs but they also made Britain feel excessively vulnerable – with terrible effects. Hitler brandished the threat of bombing at Munich, and this increased pressure on the West precisely because of their inordinate fears. According to Churchill in 1941:

This picture of air destruction [painted by the Air Staff] was so exaggerated that it

depressed the statesmen responsible for the pre-war policy, and played a definite part in the desertion of Czechoslovakia in August, 1938 (Churchill, 1950:508).

Trenchard's belief in morale effects has been roundly criticized:.

It seemed to offer a method of attack by which every bomb dropped could be made to count, thus creating an exaggerated notion of the destructive effect of air bombing, it also led to an unwarranted complacency regarding operational standards, and this in turn obscured the need to investigate the problems of defence against enemy fighters and guns and to improve the methods of navigation, target location, and bomb-aiming (Jones, 1973:163).

Seldom in the history of warfare has a force been so sure of the end it sought - the Trenchard doctrine - yet so ignorant of how this might be achieved, as the RAF between the wars (Hastings, 1989:44).

Inadequate preparations could have been avoided. Some people, including the future chief of the Bomber Command, Edgar Ludlow-Hewitt, were aware of the RAF's shortfalls in training, navigation, doctrine, and weaponry (Webster and Frankland, 1961:115-117). Despite financial constraints, the RAF was ultimately responsible for its qualitative shortcomings (Hastings, 1989:46). Under the same pressures, Air Chief Marshall Sir Hugh Dowding's success with the Fighter Command stands in stark contrast, and it highlights the failures in preparing for the strategic air offensive. Dowding's vision is widely credited with playing the major part in winning the Battle of Britain.

Examples abound showing how strategic bombing doctrine hurt preparation, and faith overrode reality in training and testing. In a 1930 exercise, British Blue forces sent 138 bombers to attack Red's capital. Judges calculated that Blue lost 150 bombers, but not before ruling that Red had capitulated after moral collapse after three nights of attack (Smith, 1980:436). The exercise was so unrealistic that the attackers lost more bombers than they had, but still bombed enough to impose victory. Similarly, extensively detailed air training manuals were based on optimistic theory not practice (Webster and Frankland, 1961:118).

Ninety percent of training flights took place in good weather and daylight. Night flights benefitted from navigating over non-blacked out, known territory (Hastings, 1989:44; Webster and Frankland, 1961:113; Jones, 1973: 117). Accuracy at night was assumed to match the day accuracy of 300 yards, even though exercises had so far shown that to be wrong (Webster and Frankland, 1961:216; Jones, 1973:134). Training under unstressed conditions made it easy to accept bombsights that required straight and level bombing runs (Hastings, 1989:45; Dean, 1979:259). Bomber Command wanted to establish a permanent live fire range in October 1938. By the time it could be implemented, WWII had started and no bombers could be spared for research (Smith, 1984:271). The small bombs of the 1930s proved incapable of wrecking industrial targets. (Webster and Frankland, 1961:124; Dean, 1979: 68; Jones, 1973:138). Since air-to-air combat had not been studied, small (.303 caliber) machine guns were installed on British bombers. Well out-ranged by German fighters but kept throughout WWII, these inadequate guns vitiated the self-defending bomber concept (Webster and Frankland, 1961:115; Hastings, 1989:45; Smith, 1984:242; Price, 1976:27). Bomber Command was dedicated to the offensive but "in each and every requirement there were grave defaults" (Dean, 1979:67).

The increasing German threat of the 1930s had some salutary effects. The threat caused a British buildup and led some targeting plans to focus on operational possibilities (Kennett, 1991:77; Webster and Frankland, 1961:86; Smith, 1984:231; Jones, 1973:140). Schemes A through Scheme M outlined the buildup plans. The Schemes were announced and partially implemented between 1934 and 1939, increasing the numbers of bombers and fighters at a ratio of approximately 2:1 (Smith, 1984:140-226; Webster and Frankland, 1961:65-81). Political leaders needed a hasty buildup in order to deter Germany. The speed of the buildup and the poor quality of available bombers meant that "Bomber Command became to a certain extent a 'shop

window' force" (Webster and Frankland, 1961:107).

On October 1, 1937, the Air Ministry approved thirteen targeting plans called "Western Air Plans." Intended missions and targets spanned industry, oil, shipping, forests, and leafletting. Counterair, transport, and industry attacks (plans 1, 4, and 5) seemed most promising but Bomber Command rejected them. Counterair was too difficult to achieve and would incur excessive casualties. Attacks on transport targets might subjugate Bomber Command to the Army. In 1938, Prime Minister Neville Chamberlain prohibited deliberate attacks on civilians and restricted attacks to identifiable military targets. This ruled-out industry attacks, even though Bomber Command estimated that by 1939 its forces could destroy German industry along the Ruhr. Mining of ports and canals and attacks on ships were also too demanding. In the end, the only plan that drew much enthusiasm was leafletting. After all the optimistic boosterism, this was the only mission that Bomber Command could execute with any confidence. As Britain's official history of the WWII air campaign notes in retrospect: "It is surely remarkable that it was less than a year before the war broke out that the Air Staff should have realized the limited possibilities of Bomber Command" (Webster and Frankland, 1961:86-106; Jones, 1973:126-49; Smith, 1984:269-305).

The closer Britain came to war, the less Bomber Command claimed to be able to accomplish. Their plans imploded, and they had to improvise at the last minute, and during the war. This contrasts with the Americans whose better planning allowed them to better stay the course.

As one of the most astute scholars on strategic bombing notes:

When the events of the late thirties began to erode the certainty of bomber invincibility, the selective reading and interpretation of information insured that reaction would be delayed and disjointed (Biddle, 2002:174).

II have shown that the British had a complex history, and strategic bombing advocates consistently chose the wrong lessons from this history. However, because these analogies held grains of truth, they helped shape beliefs, justify beliefs, and helped sell beliefs in bureaucratic battles and to the public more generally. British strategic bombing looked to the Gotha and Zeppelin attacks and saw panic, not short term alarm, and they ignored the negligible economic effects. They ignored the importance of air supremacy. They looked at air control and saw successful coercion, without seeing that conditions in Europe would be vastly different.

The American Case

American assessments of WWI showed more detachment than their British counterparts. Having been through a much less emotionally-charged war, they were less prone to overdrawn lessons and analogies. Despite imprecise analytical methods, Biddle notes that the "Americans, because they focused on British and French bombing, could be reasonably objective: no wartime claims had to be defended by the U.S. Air Service [and] they reported damage matter-of-factly" (2002:63). As a result, the American plans for future strategic bombing ended up making more sense from a military perspective.

Following WWI, the U.S. expanded its team of officers and historians and tasked them to assess the results of airpower in the War. Led by Lieutenant Colonel Edgar S. Gorrell, their chief conclusion about strategic bombing was that vital war industries should be the primary targets of attack. In their resulting bombing survey, they criticized the failure to systematically destroy industries in WWI and wrote that attacks on morale were not "a productive means of bombing" (Maurer, 1978:502; Biddle, 1984:67). However, in another report, Gorrell did note that the morale effects of bombing and strafing enemy troops could be significant (Maurer, 1978:48). Secretary of War, Newton Baker, saw air power's primary utility in tactical roles of observation

and fire control (spotting for artillery). The civilian casualties were examples of both ineffectiveness and immorality (Greer, 1985:14). America could critique morale attacks since it did not suffer the trauma of being bombed and it did not have to justify revenge. Of course, the British could have reached the same conclusions as the Americans. Indeed, many did as the memos from the British Navy and Army demonstrate.

The (Major General Joseph T.) Dickman board of 1919, which had been appointed by General John J. Pershing in 1919 to gather lessons learned from all American expeditionary efforts in WWI, was skeptical of independent air operations and argued that air power was best used to support the troops. Partly as a result, U.S. air doctrine in the early 1920s included air power primarily in combined arms/close air support roles (Craven and Cate, 1983:43; Biddle, 1984:56).

The closest resemblance the U.S. had to a Trenchard-like enthusiast was Colonel Billy Mitchell who became America's most influential strategic bombing proponent. During WWI, Mitchell enthusiastically used air power for close air support and other tactical uses, most notably during the September 1918 battle of St. Mihiel when he commanded some 1,500 allied airplanes (Biddle, 1984:52; Mason, 1976:62-65). Although he had some initial grandiose visions for strategic bombing, he believed in air superiority and envisioned an air force with 60 percent fighters, 20 percent bombers, and 20 percent observation (Murray, 2002:332).

Mitchell became more extreme over time, writing in 1919 that "modern warfare included all the population of the nations engaged" (Greer, 1985:17). In 1926, Mitchell compared old methods of war in which armies had to fight to get at each other's "vital centers" to the new method of air power which will "go straight to the vital centers...and hit them" (Hansell, 1986:4). Confronted by the same budgetary pressures and interservice rivalries as the British, American

air force doctrine during the early to mid 1920s increasingly incorporated Mitchell's views and stressed the role of the bomber (Murray, 2002:333).

However, in contrast to the British focus on morale, American doctrine came to focus more quickly and completely on military and economic targets. For example, Mitchell sold bombers as a cheap and effective coastal defense for the U.S. homeland and staged many demonstrations of bomber attacks on ships (Maurer, 1987:113-27; Craven and Cate, 1983:25). This is not to say he did not flirt with ideas similar to those being developed in Britain and it is worth noting that extreme ideas about the potential of airpower were pervasive on the international scene. Air power theorists, perhaps most notably Giulio Douhet, wrote influential books touting the need for independent air services, and arguing that strategic bombing to attack the morale of enemies would be crucial in future wars because future conflicts were not going to be just army versus army but country versus country, and peoples versus peoples (Douhet, 1984).

Reflecting these ideas, Mitchell bombed New York City in 1921 with a simulated 21 ton attack of incendiaries, HE, and poison gas bombs. He told reporters that the city lay in ruins, with people either dead or fleeing. The Air Corps bombed New York again in 1929, demonstrating air-to-air refueling (Maurer, 1987:121, 244-50). Despite these dramatic displays and Mitchell's politically inept advocacy of strategic bombing, U.S. debate on air power was never as "highly charged" or as politically salient as in England. Cooler heads prevailed in the U.S., and symptomatic of that (and of Mitchell's bureaucratic attacks on the Navy and Army), Mitchell was demoted, reassigned, and eventually court-martialed in 1925 (Biddle, 1984:137,149).

By the early 1930s and in contrast to the British, ideas for general attacks on cities had been discarded and economic targeting began to mature (Craven and Cate, 1983:47, 598).

Under the leadership of John Curry from 1931-35, the Air Corps Tactical School (ACTS)

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began to analyze how to attack economic targets. ACTS doctrine viewed nations as economic webs whose industrial systems had critical bottlenecks. Attacks on war industry were the first priority, while attacks people were a last resort (Hansell, 1986:10). American "reverence" of marksmanship, antipathy toward area attacks on civilians, and the need to be precise against enemy ships reinforced the stress on precision. America's lead in bombsight technology also allowed it to more realistically contemplate precision bombing (Craven and Crate, 1983:597; McFarland, 1995:81). The U.S. bombing strategy in WWII was a direct and consistent descendant of ACTS' doctrines (Hansell, 1986:103).

> By the end of the 1930s, airpower theorists in the Army Air Corps had evolved a theory of air warfare that was a precisely thoughtout body of interconnected assumptions. ... Considering that *little* information was available based on actual combat experience, its evolution represented a triumph of human ingenuity and imagination (Murray, 1983:335).

The first formal targeting plan for the Army Air Forces (AAF) was the Air War Plans Division - Plan 1 (AWPD-1), written in August 1941 at the request of President Roosevelt. Produced in nine days thanks to ACTS' training, it ranked four target sets in this order: electric power, transportation, oil and petroleum, and, lastly civilian attacks. Specific target lists for the latter were never developed (Parker, 1989). Except for electric power, AWPD-1 came remarkably close to the AAF's actual bombing pattern. This contrasts with the British pre-war consensus on leafletting, a consensus developed after their other plans imploded at the last moment.

American air force training and weapon development also demonstrated the quality and consistency of its preparations for strategic bombing. The U.S. had been practicing precision daylight bombing for ten years before Pearl Harbor. In tests, U.S. pilots were more accurate than their British counterparts (Craven and Cate, 1983:597-9). The first B-17 four-engine bomber

flew in 1935 and it was to become the bulwark of the 8th Air Force fleet in Europe. It was specifically designed to support precision daylight bombing (Coffey, 1977: 25). The British started WWII with smaller two-engine bombers; their heavy bombers did not enter service until 1942.

While this section is relatively short, it serves to suggest that the Americans were less plagued by overwrought historical interpretations and counterproductive analogies. This does not mean U.S. plans were perfect. As will be seen, the biggest flaw in U.S. plans was faith in the self-defending bomber (Fabyanic, 1976:30; Craven and Cate, 1983:604; McFarland, 1987:194). The U.S. did suffer sometimes staggering losses (Biddle, 1984:174). Nonetheless, the next section helps make the point that the U.S. was in fact better prepared as its doctrine and bombers fared better in the face of fire than the British.

BRITISH AND AMERICAN STRATEGIC BOMBING IN WORLD WAR II

The argument that the Americans were better prepared than the British rests on two main points. First, the Americans had more militarily effective and nuanced plans for the use of airpower. As seen in the previous sections, the British put more faith in bombing to attack morale, and less effort into developing plans to deal with enemy air defenses or to attack militarily significant targets. Second, this section highlights the relative failures in British planning. Once the war started, the British were forced to invent and change their plans repeatedly, while the Americans were able to stick to their doctrine more faithfully. This was a result of better planning, not just greater U.S. stubbornness or casualty tolerance.

Britain's efforts at strategic bombing went through three phases in rapid succession. The British attempted to bomb precision military and economic targets in daylight and then at night. Failing these, the final phase was general area bombing of cities.

Britain's first daylight bomber operations began on September 4, 1939 (one day after declaring war) with a series of raids against German warships at their bases. Losses were heavy; 7 of 29 bombers were shot down by fighters and flak. Further raids against shipping and 'reconnaissances in force' also resulted in heavy losses (Webster and Frankland, 1961:175; Cross, 1987:114; Dean, 1979:264). Similar experiences occurred when bombers tried to attack newly invaded territories. Eleven of twelve were shot down in a day attack against an armored column in France. Every Blenheim bomber attacking an airbase in Denmark was shot down (Cross, 1987:116). Meanwhile, bombers were flying leafletting operation over Germany at night with much fewer losses (Dean, 1979:265).

The daylight losses and nighttime successes led Bomber Command toward night precision operations (Webster and Frankland, 1961:429-36). Acting on the fly, the British developed a series of 20 plans for night precision attacks. Targets were similar to the Western Air Plans and included oil, communications, the air industry, industry along the Ruhr river, as well as ball bearing factories, railroads, and even forests (Webster and Frankland, 1961:135-49; Dean, 1979:267). Of these, oil was the most consistently attacked but the results were nonetheless discouraging. Through March 1941, only 646 sorties had been flown against oil targets in contrast with the 3400 called for by the plan. In some contrast, minelaying turned out not to require much precision and was quite successful over the length of the war, sinking 842 German vessels (Longmate, 1983:119). In 1941, fewer German civilians were killed by British bombing than aircrew lost (Keegan, 1989:420).

While weather was the primary obstacle in preventing sorties to attack oil targets, night targeting itself was very disappointing. As Harris said, "by the early summer of 1941 everyone who anything to do with staff policy knew that the great majority of our attacks on Germany

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were, in fact, though not in intention, area attacks" (Harris, 1990:77). The (Mr. D. M.) Butt report of August, 1941 quantified British inaccuracy. He found that only one-third of all bombers succeeding in attacking came within five miles of their targets. This improved to two-thirds for French ports and declined to one-fourth over Germany and one-tenth over the Ruhr. Under a full moon the overall rate was two-fifths and under a new moon it was one-fifteenth (Longmate, 1983:120). A bomber coming within five miles from a target is essentially meaningless as conventional bombs generally need to hit their targets or come very close to be effective. The idea of night precision is almost an oxymoron.

The dramatic conclusions of the Butt report spurred the explicit adoption of night area bombing; area bombing is the only choice if bombers are useless against more precise targets. On February 14, 1942, the Air Ministry sent a directive to Bomber Command stating "You are accordingly authorized to employ your forces without restriction" (Hastings, 1989:133). The Cherwell report a month later used operations research to detail the forces required to demolish the 58 German towns with populations over 100,000. Only half the projected output of heavy bombers through the middle of 1943 would be necessary to destroy the homes of one-third of the German populace (Hastings, 1989:127). According to Hastings there was "no moral debate in Downing Street or the Air ministry" about bombing cities (Hastings, 1989:123). On the night of May 30, 1942, the British conducted their first 1,000 bomber raid over Cologne (Hastings, 1989:152). The British persisted with area bombing through the end of the war.

Turning to the American performance, the first B-17 mission was flown against the marshaling yard at Rouen, France on August 17, 1942. General Eaker, head of the 8th Air Force Bomber Command, was in one of the planes. The bombers had heavy RAF fighter cover and all planes returned safely (Craven and Cate, 1983:661-5). Fighter escorts accompanied the American

bombers on their early short-range missions (Fabyanic, 1976:64-73; Craven and Cate, 1983:216).

The 8th Air Force came under political pressure to test the daylight self-defending bomber more thoroughly. Failure to do so threatened Eaker with loss of his bombers to the RAF Bomber Command or to the U.S. Navy (Coffey, 1977:235). On August 17, 1943, daylight bombing suffered its most disastrous defeat to date as unescorted B-17s flew deep into Germany and attacked the ball-bearing plants at Schweinfurt and a Messerschmitt factory at Regensburg. The loss rate was 16 percent, a figure which rose to 22 percent during a second attack on Schweinfurt in October. Unescorted long-range bombing operations were largely halted until fighter coverage became available (McFarland, 1987:192; Craven and Cate, 1983:681). Once escorts were available, the U.S. returned to full-scale implementation of the bombing strategy it had been developing in earnest since the early 1930s – although bombers were diverted to support the invasion of France (Overlord).

The British entered WWII not knowing what to bomb or how to do it. After stumbling through various iterations of strategies, area bombing was arrived at "*ad hoc*" (Ellis, 1990:219). The Americans entered WWII with a sounder plan and better equipment and were able to carry-out their strategy with fewer adjustments.

The American strategic bombing strategy was more effective than the British in contributing to victory in WWII, and it was more ethically sound at least in theory. Bombing of economic targets had more effect on the German war effort than the bombing of morale targets. The British bombing killed a disproportionate number of civilians compared to the U.S. This should not imply that the U.S. is beyond moral reproach. Precision bombing was a misnomer in many if not most cases, especially in the realm of long distance strategic bombing. The U.S. did participate in area attacks deliberately and by imprecision. That said, within the combined

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bomber offensive, attacks on transportation and oil did the most to win the war. The U.S. was by far the largest contributor to those attacks. These observations reflect strong historical consensus (Speer, 1970:280-3; Ellis, 1990:213-21; Keegan, 1989:432-3; Tress, 1988:9; Werrell, 1986; Weigley, 1973:354-9; Greenfield, 1982; United States, 1945:107; Longmate, 1983:348-65).

Conclusion

While other factors influenced each country's preparation for strategic bombing, the importance of analogies for Britain is striking because they had the historical experience and lessons to be much wiser. In some cases, too much knowledge may be a bad thing. I stress that I am not making the *reductio ad absurdum* argument that ignorance is blissful wisdom. Instead, I wish to underscore the basic policy prescription of many scholars in political psychology: that policy makers have to be keenly aware of how they draw lessons from history. Yet this analysis suggests taking this prescription one step further. It may be helpful not only to be aware that one is using analogies and lessons, but to go through the exercise of trying to plan without analogies and lessons. Just as there is the concept of zero-based budgeting in financial planning, zero-based approaches to other policy problems may be fruitful as well. This means that policy makers should try to imagine how they would approach the problems they face if they were not loaded down with historical analogies. I do not mean to toss historical wisdom out with the bathwater, but only to suggest that zero-based strategizing may be a useful tool for policy makers.

A second way to combat misuse of analogies is to recognize that they are implicit social science theories about the way the world works. When analogies are thrown into debates, astute observers can make their causal assumptions explicit and debate them. At least this is how analogies could work. Instead they frequently become buzz words with assumed common understandings of what they mean. When this happens, they help cause a form of unquestioning

group-think.

Although history can be read in many different ways and can be read instrumentally, analogies can still play important roles in confirming and reinforcing one's views, and in political persuasion. Critics of analogies argue that analogies are just reflections of prior interests and goals. As such, they argue that analogies are not used informationally to help decision-makers categorize and characterize situations, and choose between options. I have rebutted this critique in two ways. First, I have argued and shown that even instrumental uses of analogies to justify, debate, and persuade are important uses. Second, I have shown that policies are developed iteratively over time. In reality, situations are not characterized or decisions made in a snap. Policies are mulled over, debated, passed up and down organizations and bureaucracies, sold to publics, and so forth. Policy making involves feedback and reinforcement. This makes instrumental uses of analogies hard to separate from informational uses.

The drawing of mis-applied and organizationally motivated lessons from an emotionally-charged history is not unique to the British experience with strategic bombing in the inter-War period. The old saw of "fighting the last war" in part reflects this dynamic, and the French Maginot line, and U.S. overdependence on nuclear weapons during the 1950s and early 1960s are examples. In looking to the future, it is not hard to imagine that the Iraq War will be the basis for a number of analogies and lessons. It would be speculation to say what these will be and if they will be wisely applied. But I share the same goal and hope of most scholars of analogies, of most political psychologists, and indeed of most psychologists of any sort: that the study of cognitive patterns and pathologies will lead to wiser and more self-aware decisions.

Citations/Bibliography

Allison, Graham and Zelikow, Philip. (1999) *Essence of Decision : Explaining the Cuban Missile Crisis*. 2 ed. New York: Addison-Wesley.

Biddle, Tami Davis. (2002) *Rhetoric and Reality in Air Warfare: The Evolution of British and American Ideas about Strategic Bombing, 1914-1945*. Princeton: Princeton University Press.

Blainey, Geoffrey. (1988) *The Causes of War.* 3 ed. New York: The Free Press.

Blanchette, Isabelle and Kevin Dunbar. (2002) Representational Change and Analogy: How Analogical Inferences Alter Target Representations. *Journal of Experimental Psychology*, 28:4: 672-685.

Brown, Michael E. (1992) *Flying Blind, The Politics of the U.S. Strategic Bomber Program*. Ithaca: Cornell University Press.

Churchill, Winston. (1950) *The Second World War: The Grand Alliance*. Vol. III. London: Houghton Mifflin.

Coffey, Thomas M.(1977) *Decision Over Schweinfurt: The U.S. 8th Air Force Battle for Daylight Bombing*. New York: David McKay.

Cooper, Malcolm. (1986) *The Birth of Independent Air Power: British Policy in the First World War*. London: Allen and Unwin.

Corum, James S. and Wray R. Johnson. (2003) *Airpower in Small Wars: Fighting Insurgents and Terrorists*. Lawrence: University Press of Kansas.

Craven, Wesley Frank and James Lea Cate. (1983) *The Army Air Forces in World War II.* Vols. I, II Washington: Office of Air Force History.

Crawford, Neta C. (2002) *Argument and Change in World Politics: Ethics, Decolonization, and Humanitarian Intervention.* Cambridge: Cambridge University Press..

Cross, Robin. (1987) *The Bombers: The Illustrated Story of Offensive Strategy and Tactics in the Twentieth Century.* New York: Macmillan.

United States. (September 30, 1945) *The United States Strategic Bombing Survey: Overall Report-European War*. Frankin D'Olier, chairman. Washington: Government Printing Office.

Dean, Sir Maurice. (1979) *The Royal Air Force and Two World Wars*. London: Cassell.

Douhet, Giulio. (1984) *The Command of the Air.* Salem: Ayer Company Publishers reprint of New York, NY: Coward-McCann 1942 reprint of the 1927 second edition. The first edition appeared in 1921.

Ellis, John. (1990) *Brute Force: Allied Strategy and Tactics in the Second World War*. New York: Viking.

Fabyanic, Thomas A. (1976) *Strategic Air Attack in the United States: A Case Study.* Maxwell Air Force Base: Air War College.

Gentner, Dedre and Keith J. Holyoak.(1997) Reasoning and Learning by Analogy. *American Psychologist*. 52:1:32-34.

Goldstein, Judith and Robert O. Keohane. (1993) Ideas and Foreign Policy: An Analytical Framework. In *Ideas and Foreign Policy: Beliefs, Institutions, and Political Change.* Ithaca: Cornell University Press.

Greer, Thomas H. (1985) *The Development of Air Doctrine in the Air Arm, 1917-1941*. Washington, D.C.: Office of Air Force History.

Greenfield, Kent Roberts. (1982) *American Strategy in World War II: A Reconsideration*. Malabar: Krieger. Reprint from 1963 ed.

Gunston, Bill. (1976) *Night Fighters: A Development and Combat History.* New York: Scribners.

Hallion, Richard P. (1989) *Strike from the Sky: The History of Battlefield Air Attack, 1911-1945*. Washington: Smithsonian Institution Press.

Hansell, Haywood S., Jr. (1986) *The Strategic Air War Against Germany and Japan: A Memoir*. Washington: Office of Air Force History:

Harris, Sir Arthur. (1990) *Bomber Offensive*. London: Greenhill. Reissued from 1947.

Hastings, Max. (1989) *Bomber Command*. New York: Touchstone.

Hemmer, Christopher.(1999) Historical Analogies and the Definition of Interests: The Iranian Hostage Crisis and Ronald Reagan's Policy Toward the Hostages in Lebanon. *Political Psychology.* 20:2:267-289.

Hoffman, Bruce. (1989) *British Air Power in Peripheral Conflict, 1919-1976*. Santa Monica: Rand Corporation.

Holley, I. B. Jr. (1983) Ideas and Weapons: Exploitation of the Aerial Weapon by the United States During World War I. Office of Air Force History, USGPO. Originally published by Yale University Press in 1953.

Holyoak, Keith J. and Paul Thagard. (1997) The Analogical Mind. *American Psychologist.* 52:1:35-44.

Hough, Richard and Denis Richards. (1989) *The Battle of Britain: The Greatest Air Battle of World War II*. New York: Norton.

Houghton, David Patrick. (1998) Historical Analogies and the Cognitive Dimension of Domestic Policymaking. *Political Psychology.* 19:2:279-303.

Houghton, David Patrick. (1996) The Role of Analogical Reasoning in Novel Foreign Policy Situations. *British Journal of Political Science.* 26:4:523-552.

Jervis, Robert. (1968) Hypotheses on Misperception. *World Politics*. 20:3:454-479.

Jervis, Robert. (1997) *System Effects: Complexity in Political and Social Life*. Princeton: Princeton University Press.

Johnson, Brian and H. I. Cozens. (1984) *Bombers: The Weapon of Total War*. London: Thames Methuen.

Jones, Neville. (1987) *The Beginnings of Strategic Air Power: A History of the British Bomber Force, 1923-1939.* London: Frank Cass.

Jones, Neville. (1973) *The Origins of Strategic Bombing: A Study of the Development of British Strategic Thought and Practice up to (sic) 1918*. London: William Kimber.

Katzenbach, Edward L., Jr. (1988) "The Horse Cavalry in the Twentieth Century." In *The Use of Force: Military Power and International Politics*, edited by Robert J. Art and Kenneth N. Waltz, 3 ed. Lanham: University Press of America.

Keegan, John. (1989) *The Second World War.* New York: Viking Penguin.

Kennett, Lee. (1982) *A History of Strategic Bombing: From the First Hot-Air Balloons to Hiroshima and Nagasaki*. New York: Charles Scribner's Sons.

Khong, Yuen Foong. (1992) Analogies at War: Korea, Munich, Dien Bien Phu, and the Vietnam Decisions of 1965. Princeton, Princeton University Press.

 Levy, Jack S. (1994) Learning and Foreign Policy: Sweeping a Conceptual Minefield. *International Organization*. 48:2:279-312.

Livesey, Anthony. (1989) *Great Battles of World War I*. New York: Macmillan.

Longmate, Norman. (1983) *The Bombers: The RAF Offensive Against Germany, 1939-1945*. London: Hutchinson.

Mason, Herbert Molloy, Jr. (1976) *The United States Air Force: A Turbulent History*. New York: Mason/Charter.

Maurer Maurer. (1987) *Aviation in the U.S. Army, 1919-1939*. Washington: Office of Air Force History.

Maurer Maurer. (1978) *The U.S. Air Service in World War I*. Washington: Office of Air Force History.

May, Ernest R. (1973) *"Lessons" of the Past: The Use and Misuse of History in American Foreign Policy*. Oxford: Oxford University Press.

May, Ernest R. (1986) Conclusions: Capabilities and Proclivities. In Ernest R. May, ed., *Knowing One's Enemies: Intelligence Assessment Before the Two World Wars*. Princeton: Princeton University Press.

McDermott, Rose. (2004) *Political Psychology in International Relations*. Ann Arbor: University of Michigan Press.

McFarland, Stephen L.(1987) The Evolution of the American Strategic Fighter in Europe, 1942-44, *Journal of Strategic Studies*. 10:2:189-208

McFarland, Stephen L. (1995) America's Pursuit of Precision Bombing, 1910-1945. Washington: Smithsonian Institution.

Mitchell, Melanie. (1993) *Analogy Making as Perception: A Computer Model*. Cambridge: MIT Press.

Murray, Williamson. (1983) *Strategy for Defeat of the Luftwaffe, 1933-1945*. Maxwell Air Force Base: Airpower Research Institute.

Murray, Williamson. (2002) *War in the Air: 1914-45*. London: Cassell.

Neustadt, Richard E. and Ernest R. May (1986) *Thinking in Time: The Uses of History for Decision Makers*. New York: Free Press.

Parker, Steven. (1989) Targeting for Victory: The Rationale Behind Strategic Bombing

Objectives in America's First Air War Plan. *Airpower Journal*. 3:2:58-70.

Peterson, M. J. (1997) The Use of Analogies in Developing Outer Space Law. *International Organization*. 51:2:245-274.

Portal, C.F.A. (1959) British Air Control in Underdeveloped Areas. In Eugene Emme, *The Impact of Air Power*. Princeton: Van Nostrand.

Posen, Barry R. (1984) *The Sources of Military Doctrine: France, Britain, and Germany Between the Two World Wars*. Ithaca: Cornell University Press.

Price, Alfred. (1976) *The Bomber in World War II*. New York: Scribner's.

Risse, Thomas. (2000) 'Let's Argue!': Communicative Action in World Politics. *International Organization*. 54:1:1-39.

Rosen, Stephen Peter. (1988) New Ways of War: Understanding Military Innovation. *International Security*. 13:1:134-168.

Sapolsky, Harvey M. (1972) *The Polaris System Development: Bureaucratic and Programmatic Success in Government.* Cambridge: Harvard University Press.

Saundby, Air Marshal Sir Robert. (1961) *Air Bombardment: The Story of Its Development*. New York: Harper and Brothers.

Sears, David O., Leonie Huddy, and Robert Jervis. (2003) *Oxford Handbook of Political Psychology.* Oxford: Oxford University Press.

Sherry, Michael. (1987) *The Rise of American Airpower: The Creation of Armageddon*. New Haven: Yale University Press.

Smith, Malcolm. (1980) 'A Matter of Faith:' British Strategic Air Doctrine before 1939. *Journal of Contemporary History*. 15:3:423-442.

Smith, Malcolm. (1984) *British Air Strategy Between the Wars*. Oxford: Clarendon Press.

Snyder, Jack. (1984) *The Ideology of the Offensive: Military Decision Making and the Disasters of 1914*. Ithaca: Cornell University Press.

Speer, Albert. (1970) *Inside the Third Reich: Memoirs*. New York: Macmillan.

Stapel, Diedrick A. and Russell Spears. (1996) Guilty by Disassociation (And Innocent by Association): The Impact of Relevant and Irrelevant Analogies on Political Judgments. *Political Behavior*. 18:3:289-309.

Stokesbury, James L. (1986) *A Short History of Airpower*. New York: Morrow.

Tress, Harvey B.,(1988) *British Strategic Bombing Policy Through 1940: Politics, Attitudes, and the Formation of a Lasting Pattern.* Lewiston: Edwin Mellen Press.

Van Evera, Stephen. (1999) *Causes of War: Power and the Roots of Conflict*. Ithaca: Cornell University Press.

Vertzberger, Yaacov Y. I. (1986) Foreign Policy Decisionmakers as Practical-Intuitive Historians: Applied History and Its Shortcomings. *International Studies Quarterly*. 30:2:223-247.

Vertzberger, Yaacov. (1990) *The World in Their Minds: Information Processing, Cognition, and Perception in Foreign Policy Decisionmaking*. Stanford: Stanford University Press.

Webster, Sir Charles and Noble Frankland. (1961) *The Strategic Air Offensive Against Germany, 1939-1945*. Vols. I, II, IV. London: Her Majesty's Stationary Office.

Weigley, Russell F. (1973) *The American Way of War: A History of United States Military Strategy and Policy*. Bloomington: Indiana University Press.

Werrell, Kenneth P. (1986) The Strategic Bombing of Germany in World War II: Costs and Accomplishments. *The Journal of American History*. 73:3:702-713.

Wragg, David. (1986) *The Offensive Weapon: The Strategy of Bombing*. London: Robert Hale.