

DIFFERENT SHADES OF BLUE: INTERWAR AIR POWER DOCTRINE DEVELOPMENT

PART 2

By Major William March, CD, MA

GERMANY AND JAPAN

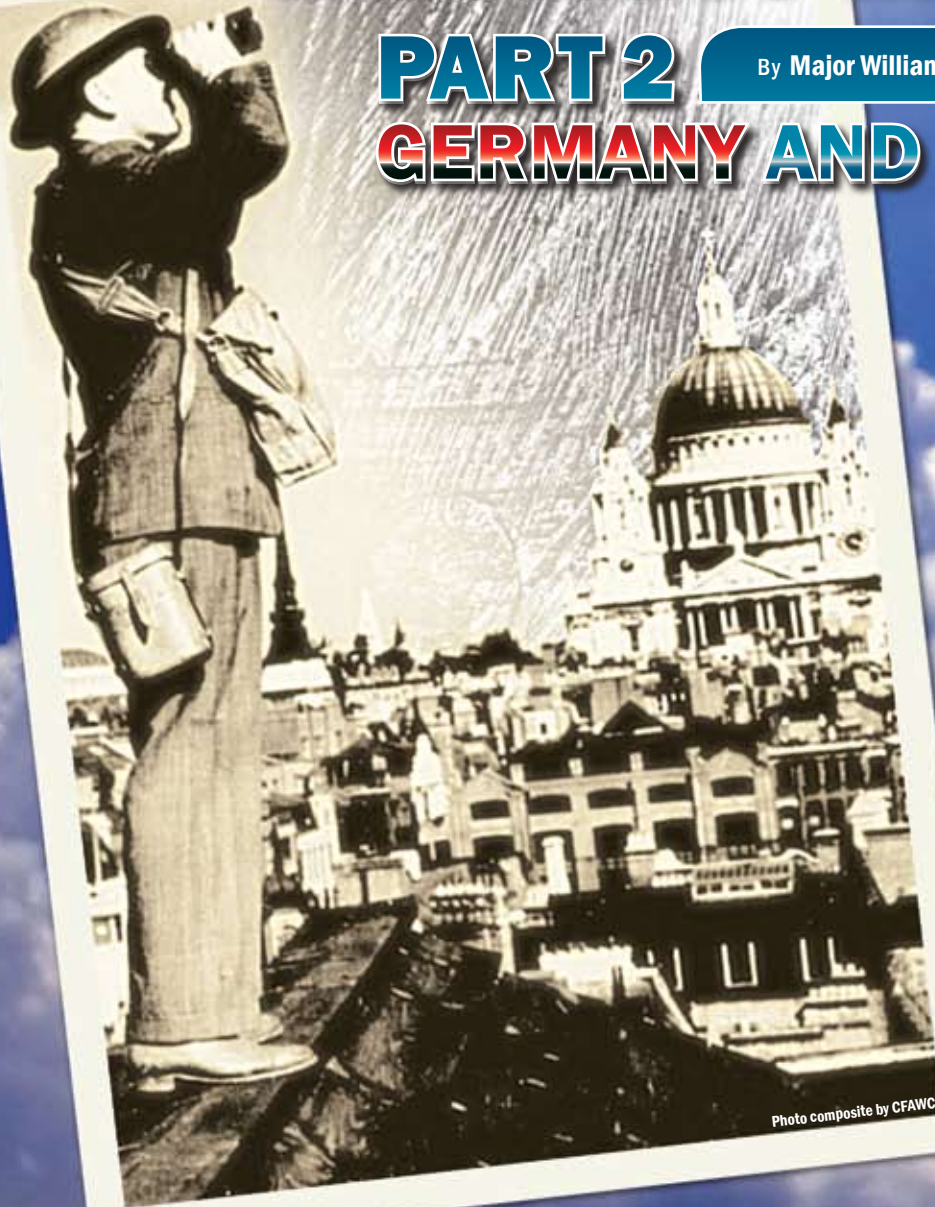


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Introduction

This is the second in a series of two articles. Part I¹ examined the emergence of aerospace doctrine between the wars and the Anglo-American approach to its development. This part looks at the same issue from the perspective of the United States (US) and Britain's major aerospace opponents during the war: Germany and Japan.

The German Approach



Like England, Germany had ended World War I with a substantial body of air power experience across all possible roles and missions. In fact, German bombing missions against London led to the creation of the Royal Air Force (RAF). Although Germany, as a defeated nation, was denied an air force by the Treaty of Versailles, this did not stop the development of air power doctrine. Under the guidance of *Generaloberst* Hans von Seeckt, the commander of the much-reduced post-war army, Germany was the only major World War I combatant to undertake a systematic study of wartime aviation. They came to the conclusion that the first task for an air force would be to establish air superiority, after which missions in support of the army and against the enemy's rear areas could be flown. These missions were primarily offensive in nature thus making the bomber the most important type of aircraft.²

German army doctrine focused a combined-arms approach to combat in which a mix of infantry, artillery, tanks, cavalry and aircraft were applied to the mission at hand. To provide air power input a small air staff provided the theoretical work while practical considerations were explored at a secret base at Lipetsk in the Soviet Union. According to James Corum and Richard Muller, it was generally accepted that once Germany rearmed the *Luftwaffe* would be a separate service, while the air staff accepted as a matter of course that a large portion of the air force would be dedicated to supporting the army.³ Therefore, unlike their Anglo-American counterparts there was no organizational pressure to create a doctrine simply to justify a separate air force. This permitted a wider appreciation of different air power roles.

Prior to the 1930s, the German air staff looked at two distinct missions. The first was ground support and the second was strategic bombing under the direction of higher command. A bomber-heavy force would be applied against targets, civil or military, that would have the largest impact on the conflict at hand. Both aspects were shaped by geographical considerations. Located in the heart of Europe and surrounded by potential enemies on all sides, Germany had to think in terms of ground warfare. Defeat on the ground, especially at the start of any conflict could very well cost Germany the war. Therefore, logic dictated that the military forces of the state, including the *Luftwaffe*, be directed to supporting the army. Williamson Murray noted that:

...in the mid-1930s it would be of little benefit to the Reich to launch "strategic" bombing attacks against Paris, Warsaw or Prague at the same time the enemy ground forces seized the Rhineland, or Silesia. In the late 1930s, when Germany had more scope for offensive operations, Germany had to win the first land battles to gain the resources to sustain a long war. If Germany did not win those first battles, the war was irrevocably lost.⁴

The United States and Great Britain, behind the Atlantic Ocean and English Channel, respectively, could remain relatively secure behind a strong navy even if they were defeated on land.

These same geographical factors influenced the German outlook with respect to strategic bombing. Whereas Great Britain and the United States had to think in terms of long-range bombers, which normally

meant four-engine aircraft, Germany's traditional enemies were France, Poland and Czechoslovakia, countries well within the range of more affordable two-engine aircraft.⁵ In addition to the geographic considerations there were industrial limitations on the type of aircraft that Germany could build. Four-engine heavy bombers demanded a level of industrial technology and available resources that Germany did not have throughout the 1930s. Therefore, for very valid reasons, the German "strategic" bombing force was made up of two-engine medium bombers.⁶

Generalmajor Walther Wever, the *Luftwaffe's* first chief of staff, was responsible for writing a comprehensive doctrine for the German air force. Entitled *Conduct of Aerial Warfare*, or *Luftwaffe* Regulation 16, it would be issued in various editions up to the end of the war. Wever understood that the air force was part of a larger, national strategy. Regulation 16 noted that "the nature of the enemy, the time of the year, the structure of his land, the character of his people as well as one's own military capabilities would determine the employment of air power."⁷ Wever's death in 1936 would be a severe blow to the *Luftwaffe*.

Basically, the *Luftwaffe's* approach to war would consist of three phases. During phase one the air force would concentrate on annihilating the enemy's air force. Phase two would be a period where the main focus of operations would be direct support to the army. Once the situation on the ground was deemed favourable phase three would commence. This final phase envisioned "deep interdiction" attacks against transportation, industrial and commercial centres. However, direct attacks against enemy populations in order to break "their will" were described as being "ineffective" and perhaps even "counterproductive."⁸ With respect to strategic

bombing, German views tended to parallel the American vice the British approach.

Unlike their Western counterparts, however, the *Luftwaffe* had had the opportunity to test both their technology and doctrinal concepts during the Spanish Civil War. German air force participation was limited to the Condor Legion, an organization that never grew beyond approximately 1,000 personnel, but which deployed transport, fighter and bomber elements to Spain. The experience gained in this conflict confirmed the need for air power to support the ground forces and it also convinced the *Luftwaffe* that strategic bombing might not be as easy as its advocates had stated. Certainly, the practical requirements of locating and accurately striking targets from the air, as well as the "staying power" of civilian populations, had proven to be problems of significantly more stature than they had been led to believe.⁹

"the nature of the enemy, the time of the year, the structure of his land, the character of his people as well as one's own military capabilities would determine the employment of air power."

Generalmajor Walther Wever

The *Luftwaffe* did not develop in a vacuum. Although its independence was never seriously questioned, the air force still had to contend with the army, navy and other

state security institutions for scarce resources. Fortunately for the *Luftwaffe*, and as it turned out for the Allies too, their Commander in Chief was Hermann Göring who was the number-two man in the Nazi party. A staunch advocate of air power, Göring liked to emphasize "his" *Luftwaffe* as a decisive war-winning air force and he ensured that the air force received more than its fair share of scarce resources.¹⁰ Therefore, from the top down, the *Luftwaffe* was conditioned to think in terms of a short war. Nevertheless, supply and resource issues would continue to plague the air force and, when coupled with the rapid expansion that the *Luftwaffe* experienced in the years leading up to the war, resulted in a somewhat uneven approach to ensuring sustainability in a long war.¹¹

Perhaps the *Luftwaffe's* greatest ally was none other than Adolf Hitler himself. He was most impressed with the potential "frightfulness" that air power introduced to the political dimension. Certainly, Hitler had capitalized on the West's fear of German air power during the Munich crisis and his annexation of the Sudetenland. As well, Murray cites Hitler's belief in the power of the German air force, which had served him so well in the past, as one of the critical factors that encouraged the German leader to go to war in 1939. As Hitler wrote at the time, "as air superiority is undoubtedly on our side, I do not shrink from solving the eastern question even at the risk of complications with the West."¹²

During the opening European campaigns of World War II, the *Luftwaffe* proved the efficacy of their doctrine. In Poland and the Low Countries, there was insufficient aerial opposition to deter the German air force from being able to support both strategic bombing and supporting the ground forces. In France, however, the opposition was such that the German air force was hard pressed to maintain aerial superiority and to provide the close air support that the army required and there were never enough resources to pursue anything


approaching a strategic campaign. Still, the short duration operations against Poland, the Low Countries and France were such that the inherent weaknesses in Germany's supply and resource availability were never a factor. This allowed the *Luftwaffe* to gain an air of "invincibility" that was not seriously challenged until their defeat during the Battle of Britain.

The dominant factor in the development of German air power doctrine was the need to pursue German goals on the international stage. Organizational and domestic political requirements, although present, were subjugated by the goals of the state. Even so, the *Luftwaffe* still followed the same basic path as that of the RAF and US Air Corps in that it was an independent air force that believed in strategic bombing. However, Germany's position in Europe meant that the *Luftwaffe* could not ignore the requirement to support the ground forces. Nor frankly, based on its historical and recent combat experience in Spain, was it likely to. The end result was "airpower [sic] theory [that was] comprehensive, practical, and well adapted to German strategy and technology."¹³ It was a significant improvement on the doctrine followed by the United States and Great Britain.



Messerschmitt Bf 109E4 Serial Number 3579 built by Arado Flugzeugwerke G.m.b.H Werk Warnemunde in 1939. This flying example was on display at Willow Run airport, Ypsilanti, MI in August 2005.

The Japanese Approach

 Japan chose a different path than either of her two primary antagonists and major European ally when it came to air power doctrine. Although James Trapier Lowe argued in *A Philosophy of Air Power* that “the strategic concept of military air power consisting of balanced air forces that could operate independently of ground and sea forces to achieve decisive results remained foreign to the Japanese until the end,” the statement is short-sighted.¹⁴ Furthermore, it reflects a post-World War II point of view heavily weighted with a belief that the US, British and, to a certain extent, German approach to air power was correct. However, the dominant form of air power was far from clear during the interwar period. In his work on the history of air power, Walter Boyne concluded that “Japan had created an able and indigenous aircraft industry, and was producing first-rate aircraft for both the Army and Navy. These aircraft were carefully tailored to their required mission, and while they did not meet the current European standards for armor [sic], self-sealing tanks, and firepower, they were well suited for the tasks expected of them.”¹⁵ This was an accomplishment that had more to do with a careful appreciation of air power from a Japanese perspective than it did from a misunderstanding of the “proper” approach to aviation and combat.

An island nation, Japan’s security has always relied on its isolated geographical position and the relative weakness of her closest neighbours. The arrival in Tokyo Bay of United States Navy (USN) Commodore Matthew Calbraith Perry on 8 July 1853 added a complicating factor. Now that the “world” was aware of Japan, Japan needed to be aware of the world. Hereafter, to ensure the security of the Home Islands, the Japanese would require a strong navy. With an almost single-minded purpose, Japan pursued such a goal and by the turn of the century had created a modern navy almost from scratch. Then in quick succession two events occurred that made the Western world “sit up and take notice” of this growing eastern power. The first was the signing of

the Anglo-Japanese Alliance in 1902 and the second was the victory of the Imperial Japanese Navy (IJN) over a Russian fleet at the Battle of Tsushima on 27 May 1905.¹⁶ The end of World War I cemented Japan’s position as a world power. An Allied “victor,” Japan came away from the war with control of the former German possession in the Pacific and one of five permanent seats in the new League of Nations reserved for those nations with the largest navies.¹⁷

An overview of Japanese naval development is essential to understanding their approach to air power. Embracing the theory put forward by Mahan and demonstrated so successfully against the Russians, the IJN firmly believed that warships winning a climactic battle with the enemy fleet would win control of the sea.¹⁸ The difficulty was that although Japan had embraced industrialization, it was still primarily an agrarian country and could not match the naval-building capacity of its two potential naval enemies: the US and Great Britain. The overriding aim of Japanese naval policy, which it pursued actively at the various naval limitation conferences that took place in the 1920s and 1930s, was to ensure that the ratio of tonnage for capital ships did not fall below 5:5:3 for the US, Britain and Japan, respectively. Tactical doctrine at the time was that a defending fleet needed to be at least 50 percent the size of the attacking fleet in order to ensure a proper defence.¹⁹

In 1923, the IJN designated the USN as its chief “hypothetical” enemy. The strategy they adopted to defeat the USN was entitled *ka omotte shō o sei-su*—using a few to conquer many. As the US fleet crossed the Pacific, the IJN would reduce the numbers of American ships through long-range attacks by submarines and cruisers. The much reduced American fleet would then be defeated by an IJN possessing superior technology and a firm belief that “the unique qualities of Japanese fighting spirit, willpower and moral superiority [would] make up for whatever quantitative inferiority limited its material.”²⁰ By the mid-1930s air power had become an important part of this strategy.

A small number of Japanese officers had flown and fought with European nations during World War I. Among their reports was the opinion that “ships able to launch and retrieve wheeled aircraft would be an inevitable development in future naval warfare.”²¹ The utility of air power was demonstrated when two Japanese aircraft flown from a specialized handling vessel saw limited action during the IJN’s campaign against German forces at Tsingtao, China. This limited experience spawned a crop of young theorists such as Engineer Lieutenant Isobe Tetsukichi who published a book entitled *War in the Air* where he predicted that “nations able to dominate the air would soon dominate the land and sea as well.” More ominously, he also predicted that “Japanese cities would burn like matchwood under ... aerial bombardment.”²² Still other theorists, such as Engineer Lieutenant Nakajima Chikuhei, wrote that air power would dominate future wars and render big-gun navies obsolete.²³ Like their Western counterparts, Japanese air power advocates were not about to let fact stand in the way of the point they were trying to make.

Assisted by Royal Navy advisors, and a gift of several aircraft made surplus by the end of the war, the IJN continued to experiment with aviation. Schools were established, and by 1925 the numbers of aviation related personnel had grown to permit the formation of a separate naval branch called the Imperial Japanese Navy Air Force (IJNAF).²⁴ During this period there was some discussion with the Imperial Japanese Army Air Force (IJAAF) about the possibility of forming an air service, but it never

matured due to rivalries between the Imperial Japanese Army (IJA) and IJN. Unlike Britain and the US, there was no overarching air power theory—such as strategic bombing—under which to reach common ground. Although the Japanese were aware of the theories of Douhet, Mitchell and Trenchard, given their geographic position and the level of aviation technology, there was no way for the fledgling air forces to launch that type of campaign against potential enemies.²⁵ Nevertheless, the Japanese were cognizant of the potential damage that aerial bombardment could inflict on their cities and worked actively at disarmament conferences to have it banned as a method of warfare.

Still, air power advocates were working hard to make air power an important element of Japanese naval strategy. In essence, debate within the IJN centred on what would deliver the crushing blow to an enemy fleet during the decisive engagement—aircraft or big-guns. Throughout most of the 1920s, the big-gun traditionalists held sway. However, the launching of two fast fleet carriers, *Akagi* (1927) and the *Kaga* (1928), allowed the IJNAF for the first time to take part in major fleet manoeuvres. In fleet exercises, the carrier-based aircraft proved their worth through reconnaissance, gunfire spotting and “attacks” on enemy shipping.²⁶ What was needed now was a catalyst to move the IJNAF to the next stage. In this case, the catalyst was Admiral Yamamoto.

Yamamoto was a carrier naval officer with a keen intellect. He attended Harvard University in the US where he not only grew to appreciate

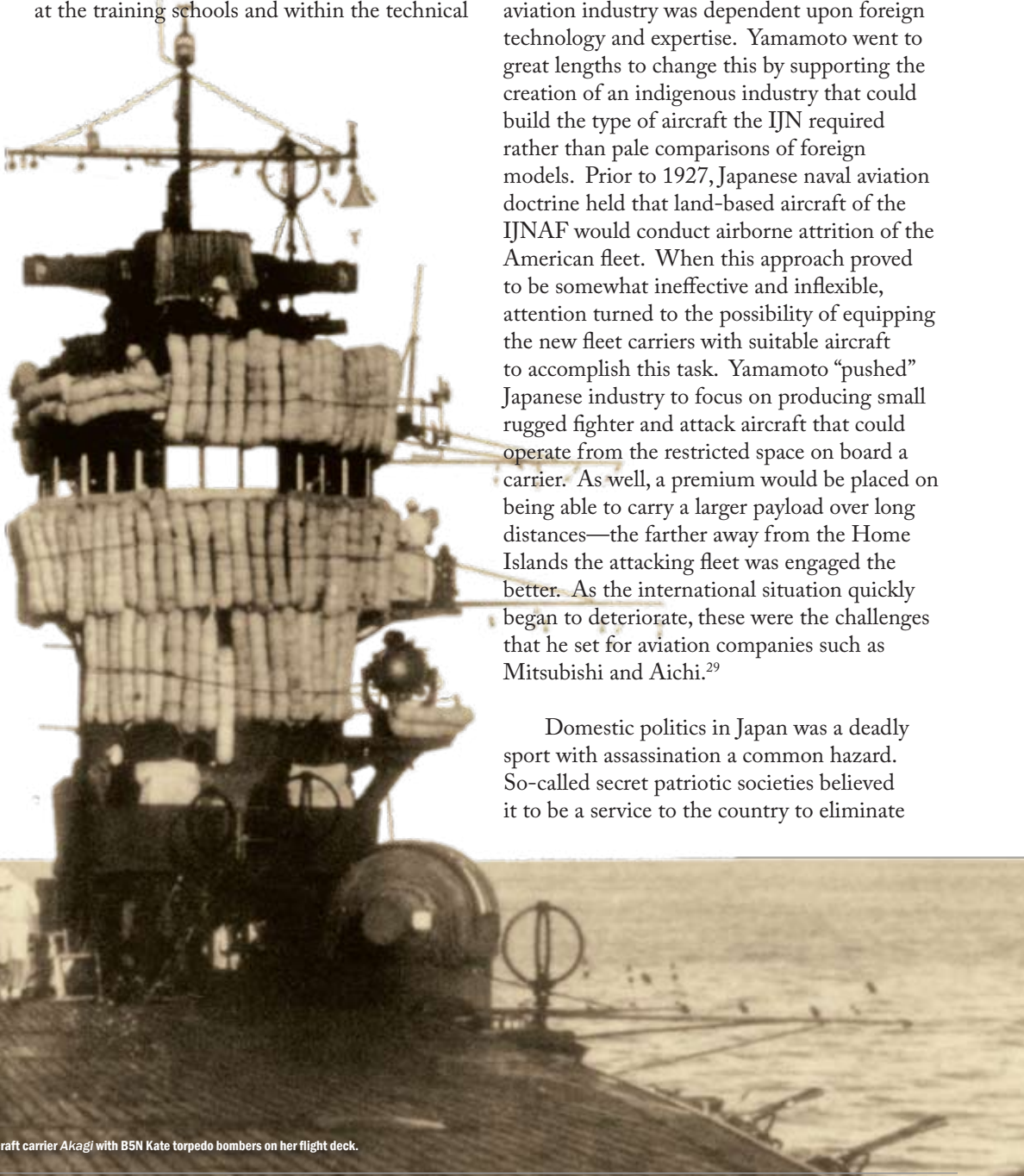


the enormous economic potential of this future adversary, he also became fascinated with aircraft and arranged for tours of American production facilities. It was at this point, according to his autobiographer John Deane Potter, that Yamamoto “had already decided that the key to future wars lay in air power.”²⁷ Throughout the 1920s he held executive posts at the training schools and within the technical

directorates of the IJN. At the schools he established a reputation for intense aircrew training without regard to casualties; however, it was his work in the Technical Division of the Naval Aviation Department that had the greatest influence on Japanese air power.²⁸

Until the early 1930s, the Japanese aviation industry was dependent upon foreign technology and expertise. Yamamoto went to great lengths to change this by supporting the creation of an indigenous industry that could build the type of aircraft the IJN required rather than pale comparisons of foreign models. Prior to 1927, Japanese naval aviation doctrine held that land-based aircraft of the IJNAF would conduct airborne attrition of the American fleet. When this approach proved to be somewhat ineffective and inflexible, attention turned to the possibility of equipping the new fleet carriers with suitable aircraft to accomplish this task. Yamamoto “pushed” Japanese industry to focus on producing small rugged fighter and attack aircraft that could operate from the restricted space on board a carrier. As well, a premium would be placed on being able to carry a larger payload over long distances—the farther away from the Home Islands the attacking fleet was engaged the better. As the international situation quickly began to deteriorate, these were the challenges that he set for aviation companies such as Mitsubishi and Aichi.²⁹

Domestic politics in Japan was a deadly sport with assassination a common hazard. So-called secret patriotic societies believed it to be a service to the country to eliminate



Aircraft carrier *Akagi* with BSN Kate torpedo bombers on her flight deck.

politicians and high-ranking officers deemed to be less than supportive of a stronger, expansionistic Japan. There was also a growing belief in the uniqueness of the Japanese character when compared with the West. This belief in the courage, resourcefulness and spiritual superiority of the Japanese, when coupled with a very real need for additional living space and raw resources, gave rise to the aggressive policies of the 1930s.³⁰

The Japanese military had a long history of involvement in domestic politics. However, the military's domination of the apparatus of government during the decade prior to the war was done with "the full complicity of other elites."³¹ Peter Duus summarizes this phenomenon as follows:

Not all the concerns outlined above ... were shared equally by all leaders in the 1930s and 1940s. But their convergence created a political context in which all demands for expansion reinforced rather than competed with one another, creating the basis for a broad coalition in favour of expansion. One has only to look at the major government decisions on foreign policy from 1936 onward to trace the ballooning accretion of expansionist goals, based less on an evaluation of what Japan was capable of doing than on what particular elements in the army, navy and bureaucracy wished to do. If there were dissenters in this process ... it was those like ... Isoroku Yamamoto, who did not disagree about the problems Japan faced but had a more realistic sense of Japan's limitations and the strengths of its potential opponents.³²

Indeed, one of Yamamoto's promotions may have had more to do with saving his life rather than being a meritorious appointment.

Nevertheless, throughout the 1930s Japan would pursue a policy of territorial expansion primarily on the Chinese mainland. Commencing with the Manchurian incident in September 1931, Japanese forces would be

in an almost constant state of conflict with either Chinese or Soviet forces and sometimes with both, and by 1937 the IJN and IJA found themselves in a full-scale undeclared war. Condemned for its belligerence, Japan withdrew from the League of Nations in March 1933 and for the next seven years attempted to diplomatically supplant the colonial powers as the dominant political force in the region. This culminated in the establishment of the Greater East Asia Co-Prosperity Sphere. In Europe as well, Japan sought additional allies and joined the Axis on 17 September 1940 with the Tripartite Pact. Western response to these activities had been a gradual reduction in the export of the critical resources, such as oil and steel, that Japan needed to function and to support its war efforts. After Japan signed the Tripartite Pact, the US completely banned oil exports and the international community quickly followed suit.³³

The deteriorating international situation influenced a change in strategy by the IJN. Although it had ceased to be bound by naval building limitations in 1936, Japan realized that it could not match the building capacity of the US, let alone the US and Great Britain combined. The IJN decided instead to place a greater emphasis on carriers and reflected this change in ordering the construction of four additional fleet carriers and the manning of extra land-based units. The change in focus was underlined in the 1934 Fleet Instructions that emphasized the need to establish air superiority at any cost prior to a fleet engagement. Aircraft would then be used in conjunction with capital ships to win a decisive victory.³⁴

Backed into a corner by the oil embargo, the IJN began to favour a southern strategy that would permit it to acquire the oil rich Dutch East Indies thus securing this vital commodity. Yamamoto, despite personal reservations against going to war with the US, now advocated making the maximum use possible of his carriers by attacking the American fleet in Pearl Harbor. He hoped that by destroying a substantial part of the American fleet, Japan

could take enough territory to provide a defensive ring around the Home Islands. He knew that Japan's only hope was to be able to win a short, decisive war and the hope for this outcome lay with carrier-based air power.³⁵

Despite Yamamoto's best efforts, the Japanese aviation industry never achieved one hundred percent self-sufficiency and it never reached the mass-production standards of the US. To a large extent this inherent weakness was compounded by the ongoing competition, often bordering on open warfare, between the IJN and IJA over resources.³⁶ Although these activities were of serious concern at the time, they would become critical once war commenced. Nevertheless, Japan produced outstanding aircraft such as the G3M1 medium bomber, the performance of which was only surpassed by the prototype B-17; the Mitsubishi A6M Zero fighter; and the Nakajimi B5N2 Type 97 carrier torpedo bomber. These would be the aircraft that the IJNAF took to war and, reflecting naval aviation doctrine and lessons learned from combat over China, in almost all cases Japanese aircraft designers sacrificed protection for speed, range and agility.³⁷ However, when these aircraft were combined with well trained aircrew and superior ordnance, such as the Type 91 torpedo, then they were formidable weapons indeed.

Japanese naval doctrine called for small, light, rugged aircraft that could strike at the American fleet at as great a distance as possible. These qualities were put to the test against

determined opponents over mainland China from 1937 until 1941. Long-range strategic bombing of cities was commonplace and the IJNAF soon learned that unescorted bomber forces were "sitting ducks" for defending



fighters. An attempt to undertake night bombing proved a dismal failure as it was beyond their capabilities to locate even the largest targets (cities) with any degree

of accuracy. It was not until the Zero began to appear in large numbers to escort the bombers that losses began to approach acceptable levels.³⁸ Still, the IJNAF had demonstrated the superiority of their aircraft, training and tactics. Although the IJN would gain valuable combat



experience, it was the ability to take this experience and apply it to naval operations that proved the most beneficial.

Under Yamamoto, the IJNAF developed an approach to naval combat that emphasized the combat experience hard won in China. Attacking from 200 miles away, an advance screen of fighters would establish air superiority over the target, while spare fighters would strafe the target, distracting and disrupting defensive elements. This attack would be followed by



a combined assault from land-based bombers and carrier-based dive-bombers in coordination with torpedo attacks. With only a slight variation—the absence of torpedo

bombers—these were the tactics that the IJN would follow when attacking shore targets.³⁹ The biggest difficulty was coordinating different groups of aircraft operating from widely-dispersed carriers, but that problem was solved when the IJN adopted a "box formation"

whereby up to four carriers would operate in a box approximately 7,000 square metres. Not only did this permit better cooperation, it also enhanced mutual defence.⁴⁰ Adopted in 1941, Yamamoto took it one step further and amalgamated his carriers with land-based naval aircraft into the First Air Fleet. This was the organization with which Japan went to war on 7 December 1941.

Air power development in Japan was radically different from that pursued by the Western nations in general and the US and Great Britain in particular. The combination of geography and aviation technology limitations in the 1920s made the pursuit of a strategic bombing doctrine problematic. As well, since inter-service rivalries and ties to the respective parent service removed any desire to form a separate air force, there was no organizational imperative to adopt strategic bombing as a rallying point. Domestic politics, although lively and somewhat dangerous, had an indirect effect on air power development, mainly through the advocacy of various international conflicts. However, domestic support for the IJN as the bastion of Home Island defence made it easier for the IJNAF to acquire the funding and support it needed to develop its approach to air power. The international security situation was the dominating factor in Japanese air power development and, like Germany, Japan developed an air force that best suited its requirements. The IJNAF demonstrated in China, and during the opening months of the war, that it was capable of a broad range of missions, from strategic bombing and attack to tactical level operations against maritime and land targets. In effect, it demonstrated that the effective application of air power did not require a focus on strategic bombing nor an independent air force.

Conclusion

It is interesting to note that Anglo-American air power development was dominated by a need to ensure either organizational survival or, in the case of the Air Corps, organizational birth. This quest for independence led air power development in

these two nations to develop an overly focused pursuit of strategic bombing. The belief in the bomber and its ability to be decisive, led to a remarkable stagnation in doctrinal thought to the point where contrary evidence was ignored. Perhaps stranger was the apparent desire prior to the war by the institutions to limit efforts to improve strategic bombing capability lest it cast doubt on the efficacy of the entire concept. Perhaps basing doctrine on organizational imperatives is not the best way to proceed.

Conversely, both German and Japanese air power development was guided by international goals, albeit expansionist ones. In both cases, air power was more fully integrated into the overall state power apparatus, although that structure proved extremely dysfunctional in the case of Japan. The relatively poor choice in examples aside, air power development in these two Axis countries seemed to indicate that doctrine based on state goals is broader and more effective.

Unfortunately, victors get to write the history of wars, and air power victors get to write doctrine. Doctrine is a useful tool to ensure organizational survival—especially during times of peace and inter-service rivalry. Therefore, it is unavoidable that a large portion of future air power scholars will continue to focus on air power doctrine that defines a special air power role that only an independent air force can accomplish. Other avenues of approach, such as the IJNAF, will escape serious study except as examples of “what not to do.” ■

List of Abbreviations

IJA	Imperial Japanese Army
IJAAF	Imperial Japanese Army Air Force
IJN	Imperial Japanese Navy
IJNAF	Imperial Japanese Navy Air Force
RAF	Royal Air Force
US	United States
USN	United States Navy

Major William (Bill) March, originally from Cornwall, Ontario, joined the Canadian Forces in 1977 under the Regular Officer Training Program. Graduating from the Royal Military College in 1982, he underwent basic navigation training in Winnipeg, and then proceeded on to CP140 Auroras, serving on 407 Maritime Patrol and 404 Maritime Patrol and Training Squadrons. Posted to Royal Roads Military College in 1990 as a squadron commander, he was promoted the next year and assumed military training and administrative duties for the College. In 1993, he completed his Master's Degree at the University of Victoria and was selected to recreate the position of Air Force Historian at 1 Canadian Air Division Headquarters for which he earned a Chief of the Air Staff Commendation. After Staff College in 1998, he filled a series of staff appointments at National Defence Headquarters which culminated in working on unmanned air vehicles (UAVs) and intelligence, surveillance and reconnaissance (ISR) for the Air Force. In 1999, his work in promoting aviation history in Canada was recognized when he was presented with the Fred Hatch Award. Posted overseas in 2003, he worked as the principal Desk Officer for the North Atlantic Treaty Organization Response Force activities of the Land Component Command Headquarters, Heidelberg, Germany. Returning to Canada in 2006, he spent two years as the Concepts and Doctrine Development desk officer for UAVs and Space at the Canadian Forces Aerospace Warfare Centre in Trenton, Ontario. Although he is still involved with UAVs, his "day job" is that of the Academic Liaison Officer within the Strategic Aerospace Research, Assessment and Liaison Branch. To make the most of his spare time, in September 2006, he commenced studies towards a PhD in War Studies at the Royal Military College. Major March has a long-time interest in aerospace history in general and Canadian Air Force history in particular.

NOTES

1. W. A. March, "Different Shades of Blue: Interwar Air Power Doctrine Development - Part I: Air Power, Doctrine and the Anglo-American Approach," *The Canadian Air Force Journal* 2, no. 1 (Winter 2009), 16-27. Available at http://www.airforce.forces.gc.ca/CFAWC/eLibrary/Journal/Current_Issue_e.asp (accessed February 9, 2009).
2. James S. Corum and Richard R. Muller, *The Luftwaffe's Way of War: German Air Force Doctrine, 1911-1945* (Baltimore: The Nautical and Aviation Publishing Company of America, 1998), 6-7.
3. *Ibid.*, 7-8.
4. Williamson Murray, *German Military Effectiveness* (Baltimore: Nautical and Aviation Publishing Company of America, 1992), 48.
5. Corum and Muller, 8.
6. James Corum, "Airpower Thought in Continental Europe Between the Wars," in *The Paths of Heaven: The Evolution of Airpower Theory*, ed. Phillip S. Meilinger (Maxwell: Air University Press, 1997), 173.
7. Murray, *German Military Effectiveness*, 43.
8. Corum and Muller, 10.
9. Murray, *German Military Effectiveness*, 25.
10. *Ibid.*, 45.
11. Williamson Murray, *Strategy For Defeat, The Luftwaffe 1933-1945* (Maxwell: Air University Press, 1983), 1-3. This is an excellent summary of the economic difficulties facing

Germany prior to the war. Murray also notes that in 1933, the *Luftwaffe* had 1,100 officers and 17,000 men, but less than seven years later it had expanded to 15,000 officers and 370,000 men which put an enormous strain on training and supply. Murray, *Strategy For Defeat*, 6-7.

12. Murray, *German Military Effectiveness*, 45.

13. Corum, "Airpower Thought in Continental Europe Between the Wars," 175.

14. James Trapier Lowe, *A Philosophy of Air Power* (Lanham, MD: University Press of America, 1984), 250.

15. Walter J. Boyne, *The Influence of Air Power Upon History* (New York: Pelican Publishing, 2003), 166.

16. For an overview of the Anglo-Japanese Alliance see Robert Massie, *Dreadnought: Britain, Germany and the Coming of the Great War* (New York: Random House, 1991), 339-341. For a discussion of the Japanese role in the Battle of Tsushima see Stephen Howarth, *Morning Glory: The Story of the Imperial Japanese Navy* (London: Arrow Books, 1985), 89-96.

17. Howarth, 141. The former German possessions included islands in the Marshall, Carolina and Mariana groups. This territory provided Japan with a "barrier" between the US and the Philippines.

18. A.T. Mahan, *Naval Strategy* (London: Sampson, Low, Marston & Co., 1911), 199. Japan was no stranger to Mahan—for an overview of his influence see Roger Dingman, "Japan and Mahan" (paper presented at the Mahan Centennial Conference, Naval War College, Annapolis, Maryland, April 29 – May 1 1990).

19. Military History Section, Headquarters Army Force Far East, Monograph 160, "Outline of Naval Armament and Preparations for War, Part III," *War in Asia and the Pacific, Vol. 4: The Naval Armament Program and Naval Operations (Part 3)* compiled by Donald S. Detwiler (New York: Garland Publishing, 1980), 4.

20. Mark Peattie and David Evans, *Kaigan: Strategy, Tactics and Technology of the Imperial Japanese Navy, 1887-1941* (Annapolis: Naval Institute Press, 1997), 212.

21. Mark Peattie, *Sunburst: The Rise of Japanese Naval Air Power, 1909-1941* (Annapolis: Naval Institute Press, 2001), 6.

22. *Ibid.*, 11.

23. *Ibid.*, 11-12.

24. Alvin Coox, "The Rise and Fall of the Imperial Japanese Air Forces," in *Air Power and Warfare*, ed. Alfred Hurley and Robert Ehrhart (Washington: Government Printing Officer, 1979), 86.

25. Lowe, 119-110.

26. Peattie and Evans, *Kaigan*, 248.

27. John Deane Potter, *Admiral of the Pacific: The Life of Yamamoto* (London: Cox and Wyman, 1965), 17-18.

28. *Ibid.*, 20.

29. Peattie and Evans, *Kaigan*, 303.

30. Ben-Ami Shillony, *Politics and Culture in Wartime Japan* (Oxford: Clarendon Press, 1981), 134.

31. Peter Duus, "Japan's Wartime Empire: Problems and Issues," introduction to *The Japanese Wartime Empire, 1931-1945*, ed. Peter Duus, Ramon H. Myers and Mark Peattie (Princeton: Princeton University Press, 1996), xiv.

32. Ibid., xvii.

33. Peattie and Evans, *Kaigan*, 455-456.

34. Ibid., 250.

35. Ibid., 453-456 and 473-475.

36. Coox, 93.

37. Peattie, *Sunburst*, 86-89.

38. Ibid., 116-125.

39. Ibid., 146.

40. Ibid., 148-149.



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