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JAPANESE AIR POWER 1919-1945
A CASE STUDY IN MILITARY DYSFUNCTION

By

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About the Author

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INTRODUCTION

It is axiomatic that the armed forces of any society will reflect its attitudes and values. These will affect the way it is recruited and trained, how it is structured and how it will fight. The two Japanese air arms, the Japanese Naval Air Force (JNAF) and the Japanese Army Air Force (JAAF), provide a practical case study of this principle. They were born and bred in a cultural milieu which, while emphasising the spiritual martial values of a warrior ethos, also promoted factionalism and a conservative and non-intellectual outlook. This was to outweigh the warrior virtues and eventually lead to disaster. The problems were to become evident from the earliest days of the JNAF and JAAF. Despite them the two air arms were to be decisive in the conquests of 1941 and early 1942 which saw Japan incorporate all the British, Dutch and American territories in Asia within the Greater East Asia Co-Prosperity Sphere. Yet within two years both had been largely eliminated as effective fighting forces. From late 1944 Allied aircraft operated with impunity over Japanese air space. Japan's major cities were burned and her industries gutted. The atomic bombs were dropped by unescorted bombers.

This paper will outline the military culture in which the Japanese air arms developed. It will examine the course of the development of the air arms up to the outbreak of the Pacific War. It will then analyse the conditions which enabled them to perform so spectacularly in the early days of the war and finally describe how their innate culture was to lead to their decline into ineffectuality.

PART 1 – THE JAPANESE MILITARY CULTURE

Japanese social outlook was defined by the importance of the family unit. This inward looking family, or clan, loyalty was reflected in business, politics and bureaucracy and was exemplified by widespread factionalism. It placed inhibitions on the ability of the individual to act according to their own judgement. Japanese lives were dominated by a supremacy of custom and submission to authority.[1] Factionalism and conservatism were to play an important part in the decline of Japanese air power.

The special relationship of the Japanese race to the divinity of the Emperor imbued in the Japanese serviceman a feeling of moral or spiritual superiority over opponents which led to the discounting of the importance of the more intellectual, technological and logistical aspects of war. This was noticeable in the late 1920s when attempts to use savings from personnel reductions to pay for technical modernisation in the Army were strongly resisted by conservative forces who emphasised traditional values, spiritual elements and training rather than mechanisation. After 1931 this faction was dominant in the Japanese Army bureaucracy.[2]

The importance of spirituality in the Japanese armed forces was demonstrated by the reaction to the defeat inflicted by Soviet mechanised forces in the Nomonhan

[1] Thorne, Christopher, *The Issue of War: States, Societies and the Far Eastern Conflict of 1941-1945*, Hamish Hamilton, 1985, p 65.
[2] Kitaoka, Shin'ichi, 'The Army as Bureaucracy: Japanese Militarism Revisited' in *The Journal of Military History*, Vol 57, No 5, October 1993, pp 76-79.

campaign in 1939. Enhanced spiritual training was called for to 'smash the enemy's materialism'.[3] Officers suggesting modernisation were castigated and removed from positions of influence.[4] Ironically, one general so treated was demoted to duties concerned with the build-up of the JAAF as his punishment.[5] This spiritualism was taken to new heights by Japan's stunning victories over the Western powers, to the extent that the Japanese serviceman was considered to have 'superhuman virtue', eclipsing that of the European soldier.[6] Despite an unbroken succession of defeats, this attitude still prevailed in late 1944, when it was believed that the moral superiority of the Special Attack Corps (kamikazes) would unnerve and discourage the 'cowardly Yankees'.[7]

The Japanese serviceman of the Pacific War was less than 100 years removed from the feudal traditions of the Samurai, the class from which the Army and Navy were drawn after the commencement of modernisation. The military life of the medieval Samurai with its simple weapons and campaigning in the confined area of Japan required little in the way of logistics, intelligence or planning; an uncomplicated warrior ethos prevailed. In the 20th century these values were reflected in the Japanese command structure. Although all staff bureaus were theoretically equal, in fact the operations bureau held the real power, even the Chief of Army Staff being little more than a robot.[8] 'High spirited' and 'glamorous' combat officers disliked the 'plodders' and 'worriers' who worked in intelligence and logistics.[9] Logistics were regarded as 'boring'.[10]

Japanese Training

Traditional Samurai values were reinforced through strict indoctrination during training. The army was authoritarian and conservative, characteristics reinforced by recruiting officer cadets from military schools. Typically these were young men from a conservative and traditional rural background. They were recruited at the age of twelve to thirteen and were from that time isolated from normal society.[11] Their education imbued them with a contempt for Western values which led to an ignorance of, and lack of interest in, enemy fighting potential and a total underestimation of it.[12] Many officers who visited the West, like Tojo, simply confirmed their prejudices of Western decadence.[13] The Navy was more cosmopolitan and less political, drawing its officer cadets from schools. This outlook was reinforced by a wider contact with the world. Nevertheless at the Naval College at Etajima, learning was by rote and there

[3] Coox, Alvin, *Nomonhan, Japan against Russia*, Stanford University Press, 1985, Vol 2, p 1018.
[4] *ibid*., pp 1027-1028.
[5] *ibid*., p 1030.
[6] Calvocoressi, Peter, Wint, Guy and Pritchard, John, *Total War, The Causes and Courses of the Second World War*, Vol II, *The Greater East Asia and Pacific Conflict*, Penguin, London, Revised Edition, 1989, p 420.
[7] Millot, Bernard, *Divine Thunder*, Mayflower, St Albans, 1974, p 25.
[8] Coox, Alvin, *Flawed Perceptions and its Effect on Operational Thinking*, Unsourced photocopy, Australian Defence Force Academy Library, c.1986, p 239.
[9] *ibid*., p 240.
[10] Coox, Alvin, 'Rise and Fall of the Imperial Japanese Air Forces' in Alfred Hurley and Robert Ehrhardt, *Air Power and Warfare*, United States Air Force, Washington 1979, p 94.
[11] Spector, Ronald, *Eagle against the Sun, The American War with Japan*, Viking, Harmondsworth, 1985, p 34.
[12] Coox, *Flawed Perceptions*, p 240.
[13] *ibid*., p 244.

was no room for individuality.[14] Both Army and Navy cadets were heavily indoctrinated in the Imperial Rescript of the Emperor Meiji which emphasised loyalty to sovereign and country; courtesy in relationships between superiors and inferiors; valour, characterised by the notion that, when the country was in danger, death was preferable to dishonour; fidelity, especially in the sense of the fulfilment of one's duty; and simplicity, excoriating 'luxuriousness and extravagant ways'.[15]

The Prevalence of Factionalism

Japanese military education reinforced the tendency to factional loyalty innate in the Japanese psyche and gave no encouragement to rational comprehension of a rival organisation's position. It certainly did nothing to promote interservice cooperation. Differences between the Army and the Navy were taken to absurd lengths and were to act as a canker, promoting inefficiencies throughout the Japanese military system. Reflecting the prevalence of organisational loyalty in Japanese society, the conflict between the two services had been the norm since the Meiji period. It grew from the different foreign models adopted by the two services; the Navy looked to Britain, the Army initially to Germany and then, after the First World War, to France. The two services had different strategic outlooks with the Army looking to the mainland of Asia while the Navy focussed on South East Asia and the Pacific.[16] These differing strategic views were (more than simply) a disagreement about national objectives; each party promoted its respective strategy to emphasise its predominance over the other.[17]

The factional loyalty that soured interservice relations was also a feature of intraservice relations. The Navy was organisationally a collection of fiefdoms with little interaction between the surface, submarine and carrier arms, and between the Fleet Staff and the General Staff in Tokyo.[18] One consequence was the inability of the JNAF to play a significant part in the critical anti-submarine campaign, its long range patrol aircraft being used mostly for fleet duties. This is in contradistinction to the Allied air arms which played a critical role in anti-submarine warfare. The Japanese Army was also divided into cliques and factions. These resulted from clan rivalries, differences between the elite Army War College graduates and those destined for more mundane duties and differences between those who emphasised the traditional values and those who wished to modernise the army.[19]

This compartmentalisation of service responsibilities may be contrasted with the American Joint Chiefs of Staff, who, despite interservice rivalries, disagreements and personal antipathies, worked together because, as Spector notes, the 'need to get along [was] a compelling influence'.[20] American and Allied strategy was marked by the cooperation of different arms of service, different services and different nations in

[14] Marder, Arthur J., *Old Friends, New Enemies. The Royal Navy and the Imperial Japanese Navy, Strategic Illusions, 1936-1941*, Oxford University Press, Oxford, 1981, p 268.
[15] *ibid., pp* 271-272.
[16] *ibid*., p 289.
[17] Toshiyuki, Yokoi, 'Thoughts on Japan's Naval Defeat' in D.C. Evans (ed), *The Japanese Navy in World War II*, The Naval Institute Press, Annapolis, 2nd edition, 1986, pp 501-502.
[18] Hone, T.C., and Mandeles, M.D., 'Interwar Innovation in Three Navies: US Navy, Royal Navy, Imperial Japanese Navy' in *Naval War College Review, Vol XXXX, No 2 Spring*, 1987, pp 63-83.
[19] Spector, *Eagle against the Sun, The American War with Japan*, p 35.
[20] *ibid*., p 125.

order to achieve agreed strategic, operational and tactical goals. Japanese factional politics, resulting from the Army-Navy dispute, hampered development of a grand strategy integrating the elements of politics, economics, diplomacy and military affairs. The joint service Imperial Planning Headquarters only came into being in time of war and could conduct no planning in peacetime.[21]

PART II – THE DEVELOPMENT OF THE JAPANESE AIR ARMS 1919-1941: THE PROBLEMS EMERGE

The Period of Foreign Access, 1919-1931

The end of the World War I found both the Imperial Japanese Navy and Army with minuscule arms operating obsolete equipment. Only a handful of pilots had seen any operational service and this was confined to limited operations in Asia. There was no exposure to the explosive developments in military aviation that had taken place in the West. It was obvious to both services that to absorb the lessons of the war it would be necessary to modernise both air arms. The course adopted was that traditionally taken by the Japanese - obtaining foreign assistance.

True to type, the two services turned to different mentors. The Army, which had traditionally followed German practice, turned to France, then the most important military power in Europe. In 1919 the French dispatched to Japan the Faure Mission with a team of sixty-two instructors and technicians and a large number of modern French aircraft. The Anglo-Japanese Treaty, through which the Japanese Navy had maintained traditional links with the Royal Navy, was still in force. An unofficial British advisory group, which only had guarded British Government approval, was dispatched in 1921 to assist in the development of JNAF. Its leader was retired Colonel W. F. Forbes-Sempill, an ex-RNAS and RAF officer. The mission brought with it large numbers of British aircraft.

Apart from contributions made directly to the armed services by the missions, the Japanese aircraft construction industry was also heavily dependent on foreign assistance. The three larger engineering firms, Mitsubishi, Nakajima and Kawasaki, which were to form the core of the Japanese aircraft construction industry, all developed close links with European companies to obtain details of the latest technology. As a result the Japanese firms employed large numbers of European aircraft designers and even test pilots to develop their aircraft production skills.[22] The first Japanese torpedo bomber, for example, was designed by Herbert Smith of Sopwith and test flown by Captain Jordan.[23] The great preponderance of new designs were foreign.

[21] Toshiyuki, 'Thoughts on Japan's Naval Defeat', p 502.
[22] Mikesh, Robert, 'The Rise of Japanese Naval Air Power' in Robert Gardiner (ed) *Warship 1991,* Conway Maritime Press, 1992, pp 102.
[23] King, H.F., *Sopwith Aircraft 1912-1920,* London, Putnam, 1980, p 199.

Involvement in Japan's nascent aircraft industry gave foreign powers the opportunity to evaluate Japanese capabilities and their analyses were not flattering. In a lecture to the Navy Ministry in October 1922, Sempill was critical of Japanese pilots and aircraft.[24] Another of Sempill's officers wrote to his fiancee:

> It has been tiring and trying work with the little fellows. They are all very inconsistent and show very bad judgement....[25]

The British Naval Attache in Tokyo reported that the Japanese were:

> inferior students....impractical, careless, dilatory and, through pride, loath to be taught, fancying they know as much as their instructors.[26]

There was much justification for these views. Since the Battle of Tsushima, where the Imperial Japanese Navy destroyed the Russian Fleet, less than twenty years earlier, the battleship gun had reigned supreme so far as the Imperial Japanese Navy was concerned and the best and most ambitious officers specialised in gunnery. The air arm was not prestigious and had poor promotion prospects. Those officers who opted for aviation were only 'fifth rate'.[27] The Army also demonstrated a poor appreciation of the potential of air power. The French influence led to a concentration on the use of aircraft as tactical weapons with Air Wings tied to Divisional commands.[28] Army aircraft construction was conservative and poor in quality.[29]

The fierce rivalry between the two Japanese armed services severely constrained the early development of Japanese air power. The continual tensions between the Army and Navy made any discussion of the forming of an independent air force, even one jointly controlled by both services, futile.[30] Consequently the country developed two separate air arms to suit the strategic and operational concepts of their parent services. The Army, with its emphasis on operations on the Asian mainland, developed the JAAF as essentially a tactical force for operations in support of ground formations; the Navy, which tended to have a wider view, informed by the greater range and complexity of operations consistent with its strategic emphasis on South East Asia and the Pacific, developed a more sophisticated and flexible air arm.

Development of an indigenous aircraft industry proceeded slowly. Foreign aircraft and engine designs predominated well into the late 1920s.[31] JNAF attempts to equip the carrier force with Japanese designed aircraft led to its sponsoring competitions for testing a number of local designs. The results were very disappointing and, in the end, foreign designs were adopted. Modernisation of the JAAF was also delayed by the lack of indigenous designs.[32]

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[24] Marder, *Old Friends, New Enemies*, pp 342-343.
[25] Quoted in *ibid.*, p 342.
[26] Quoted in Ferris, John, 'A British "Unofficial" Aviation Mission and Japanese Naval Developments 1919-1929' in *Journal of Strategic Studies*, Vol 5, No 3, September 1982, p 423.
[27] Marder, *Old Friends, New Enemies*, p 304.
[28] Sekigawa, Eiichiro (Trans C. Ushida, English edition edited by David Mondey), *Pictorial History of Japanese Military Aviation*, Ian Allan, London, 1974, p 27.
[29] *ibid.*, p 28.
[30] *ibid.*, p 20.
[31] *ibid.*, p 33.
[32] Green, William and Fricker, John, *The World's Air Forces*, Macdonald, London, 1958, p 179.

The Wars on the Asian Mainland and the Years of Secrecy 1931-41

Although the Japanese had had serious difficulties developing their air arms, some progress had been made. Progress in local design, if slower than had been hoped, was steady and by the early 1930s some local designs were just coming into service. In addition administrative, training and support infrastructures were developed.

In 1931 and 1932 the JAAF and the JNAF were to be used operationally in China and Manchuria, gaining valuable combat experience which dramatically demonstrated the importance of air power. As a consequence, progress in the development of Japanese air power increased substantially from the levels of capability reached during the years of foreign assistance.

Army experience in Manchuria led to an important change in its concept of air operations. There was a new emphasis on air superiority rather than tying aircraft to missions in close support of ground operations as had been taught by the French advisory team.[33]

From 1932 annual air defence exercises were carried out and a military air cadet service was established. Of particular importance was the foundation of the Naval Aircraft Establishment in 1932 which was intended to expedite the development of combat aircraft for the JNAF. This facility was active in developing long range land based bombers to offset the British and American preponderance in heavy surface combatants brought about by the provisions of the Washington Naval Treaty.[34] The JAAF also undertook a successful aircraft development programme. Both services were developing better fighters and bombers capable of long range operations. Foreign designs were still evaluated and occasionally built under licence but they were mostly adopted for second line aircraft.[35]

It was in this period also that a significant improvement was made in the quality of JNAF aircrews. Able young officers, noting the rapid advances in naval aviation, were applying in increasing numbers for that branch. The revered Togo, victor of Tsushima and proponent of supremacy of the battleship, died in 1934. His death corresponded with the rise of naval air power advocate Isoroku Yamamoto who not only encouraged men to join the air arm but provided incentives for them to develop proficiency in night flying and carrier flying operations.[36] In 1931 he became head of the technical arm of the navy and was determined to make aircraft the main striking force of the fleet. The outbreak of the Manchurian conflict provided him with the opportunity to insist on increased aircraft production.[37]

During the 1930s the Japanese Navy built a powerful aircraft carrier force. The navy had shown interest in shipborne aircraft as early as 1914 and the importance of naval aviation had been demonstrated in the 1919 manoeuvres.[38] Apart from other small

[33] Mikesh, 'The Rise of Japanese Naval Air Power', p 108.
[34] *ibid*., p 111.
[35] Sekigawa, *Pictorial History of Japanese Military Aviation*, p 58.
[36] Marder, *Old Friends, New Enemies*, p 305.
[37] Potter, John Deane, *Admiral of the Pacific, The Life of Yamamoto*, Heinemann, London, 1965, p 23.
[38] Ferris, 'A British "Unofficial" Aviation Mission and Japanese Naval Developments 1919-1929', p 418.

carriers two large carriers, *Kaga* and *Akagi*, were in service by 1930 as responses to the large American carriers *Lexington* and *Saratoga*.[39]

By 1930 the Japanese Navy had started to concentrate its carriers into a 'flying squadron'.[40] By 1941 the Japanese had completed four more modern large carriers and the *Kaga* and *Akagi* were extensively modernised. All of these vessels were fast and carried large aircraft complements. Supported by a number of smaller carriers and seaplane tenders, they were to play an important role in the early campaigns.

As the 1930s progressed more money became available to the Japanese armed services. The role that aviation played in the Manchurian and Shanghai Incidents boosted enthusiasm for the creation of powerful air arms.[41] Apart from increases necessary to finance the conflict on the Asian mainland, senior officers became deeply concerned after the February 26 Incident in 1936 when a group of young military officers staged a coup, seizing the Diet building and the War Ministry in Tokyo. Attempting to appease the volatile younger army officers, the military budget was increased to the extent that it accounted for nearly 50% of the overall budget.[42]

There was strong emphasis on training. Japanese pilots were given around 300 hours of flying training before being sent to their units. This compared with 200 hours for the US Army Air Corps.[43]

In 1937 the war with China broke out and both the JAAF and the JNAF were heavily involved. Important lessons were learned, especially by the JNAF. While the JAAF mostly carried out its traditional role of support for the ground forces, JNAF extended itself into new areas of operation. It conducted long range bombing missions up to a previously unheard of distance of 1 250 kms; developed the use of fighter bomber aircraft in close support of ground troops, traditionally a JAAF function performed by lower performance light Bomber types; gained experience in rapidly deploying forward to new airfields and in the combined operation of fighters, bombers and reconnaissance aircraft. Offensive fighter sweeps were developed and aircraft were operated from carriers under combat conditions.[44]

Although the development of Japanese air power progressed steadily, problems were still evident. Japanese successes in China should be seen in the context of the opposition encountered. Chinese air strength was highly decentralised and was equipped with 'a nightmarish mix of suitable and unsuitable aircraft imported from a variety of nations'. Rather than a single Chinese Air Force many warlords had their own private air arms. Air missions to China, each with different ideas on air operations, came from the Soviet Union, the United States and Italy and aircraft, many of which were unsuitable, from an even wider variety of countries.[45] The

[39] Sekigawa, *Pictorial History of Japanese Military Aviation*, p 29.
[40] Ferris, 'A British "Unofficial" Aviation Mission and Japanese Naval Developments 1919-1929', p 435.
[41] Sekigawa, *Pictorial History of Japanese Military Aviation*, p 40.
[42] Kitaoka, 'The Army as Bureaucracy: Japanese Militarism Revisited', p 40.
[43] Coox, *Rise and Fall*, p 90.
[44] Okumiya, Masatake, and Horikoshi, Jiro with Caidin, Martin, *Zero! The Story of the Japanese Naval Air Force*, Corgi, London, 1958, pp 19-43.
[45] Hallion, Richard P., *Strike from the Sky: The History of the Battlefield Air Attack 1911-1945*, Smithsonian Institute Press, Washington and London, 1989, pp 118-119.

Chinese had only 230 effective aircraft in service at the outbreak of the war, of which 91 could be called modern; the JNAF and the JAAF deployed 900 aircraft.[46] However despite their great successes, the Japanese were never able to completely defeat the Chinese, who even succeeded in bombing Formosa and, on one occasion, dropped leaflets over Japan itself.[47]

Between May and September 1939 Japan fought a savage conflict with the Soviet Union in the Nomonhan Area. Air operations were extensive. Although the JAAF, with China combat experience, was initially very successful the Soviets were able to redress the balance with the introduction of new aircraft and veterans from the Spanish civil war of 1936-39.[48] As the fighting progressed the JAAF was to play an 'increasingly ineffectual role in the battle' and was eventually unable to protect its own land forces from Soviet air strikes.[49] The situation became so drastic that towards the end of the conflict the JAAF was considering calling upon the JNAF for assistance.[50] Despite their great qualitative improvement in aircraft design in the 1930s, Japanese aircraft of the period still lagged behind the best European practice. Although aircraft such as the A5M and Ki-27 fighters were effective in the conditions prevailing in the East, with their fixed undercarriages, open cockpits and light armament, they were greatly inferior to the contemporary Britain's Hurricane and Germany's Bf 109. Even the Zero, entering service in 1940 was generally an inferior aircraft to the Spitfire which entered squadron service two years previously.

However, by 1941 well trained, highly motivated air services with considerable operational experience from which they had derived effective combat doctrines were ready to be unleashed upon the Western powers in Asia and the Pacific. They, however, had largely missed these developments.

PART III – WESTERN PERCEPTIONS OF JAPANESE AIR POWER AND THE EARLY TRIUMPHS

With three devastating attacks, Pearl Harbor, the sinking of *Repulse* and *Prince of Wales* and the destruction of the B-17 force in the Philippines, the Japanese air arms set the stage for the lightning Japanese conquests that created a vast but shortlived empire. Given the dysfunctions of the Japanese services this overwhelmingly successful use of air power requires explanation.

Allied Strategic Inferiority

Allied preoccupations with the situation in Europe and the Middle East meant that the Far East had low priority for reinforcements and modern equipment. There is little doubt that their position in late 1941 and early 1942 was untenable. Their numbers were woefully inadequate. It was estimated that 582 aircraft were required for the

[46] *ibid.*, p 118; Sekigawa, *Pictorial History of Japanese Military Aviation*, p 60.
[47] Hallion, *Strike from the Sky*, p 120.
[48] *ibid.*, p 124.
[49] *ibid.*, p 126.
[50] Coox, *Rise and Fall*, p 89.

defence of Malaya;[51] only 164 were available with 88 in reserve.[52] The most important fighter used by the British in the East was the Brewster Buffalo, an aircraft designed for the US Navy but rapidly being replaced. It had been developed beyond the limits of its airframe with deleterious effects on speed, manoeuvrability, climb and ceiling. Attempts to lighten it left it underarmed. The backbone of the bomber force was the obsolescent Blenheim I. There were few airfields and only a small maintenance facility at Singapore.[53] Only 17% of the airfield defence anti-aircraft guns were available and both radar and signals facilities were inadequate.[54] There appears to have been little serious training, at least in some units, and on occasions personnel in Malaya were reduced to carrying out silly stunts to keep themselves amused.[55]

The most modern aircraft available for the defence of the Philippines was the P-40E fighter, the remainder being the older, slower P-40B, P-35 and totally obsolete P-26 aircraft.[56] Even the P-40E was found to be too underpowered for interception duties.[57] As in Malaya training was often deficient. Many of the pilots came straight from flying school, yet for much of 1941 local training emphasised formation flying. Effective gunnery training was prevented by a shortage of ammunition.[58] The American strategy for the defence of the Philippines was based on a force of B-17 heavy bombers intended to attack Japanese airfields in Indo China and Formosa.[59] However the strategy for Pacific defence gave priority to the West coast of the United States followed by Hawaii with the Philippines a poor third. Only thirty aircraft were on strength in the Philippines when the war commenced.[60]

There was a malaise in the United States' forces. The US Army was a neglected service, starved of funds. During the 1930s, when the Japanese were increasing the resources devoted to research and development, the US Army was allocated only 2% of the national budget.[61] Like the Japanese, the non-commissioned ranks tended to be poorly educated. Promotion for officers was slow and they tended to be isolated from civilian life. Air officers were generally junior to other Army officers.[62] The doctrinal emphasis was on the bomber, either as a weapon of economic attack or as a weapon of coast defence.[63] Insofar as the US Navy was concerned, the US Naval Academy, Annapolis, was intellectually sterile, emphasising the moulding of character rather than the stimulation of intellect. As with Etajima there was an emphasis on the battleship as the arbiter of sea power.[64]

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[51] Gillison, Douglas, *Royal Australian Air Force, 1939-1942,* Australian War Memorial, Canberra, 1962, p 145.
[52] *ibid*., pp 204-205.
[53] Overy, Richard, *The Air War, 1939-1945,* Europa Publications, London, 1980, p 89.
[54] Shores, Christopher and Cull, Brian, *Bloody Shambles,* Grub Street, London, 1992, Vol I, pp 32-33.
[55] *ibid*., pp 36-37.
[56] Bartsch, William H., *Doomed at the Start. American Pursuit Pilots in the Philippines, 1941-1942,* Texan A and M University Press, College Station, 1992, p 2.
[57] *ibid*., p 25.
[58] *ibid*., pp 22, 25, 28.
[59] Overy, *The Air War, 1939-1945,* p 88.
[60] *ibid*., pp 88-89.
[61] Spector, *Eagle against the Sun, The American War with Japan,* pp 10-11.
[62] *ibid*., p 13.
[63] *ibid*., pp 14-16.
[64] *ibid*., pp 18-19.

While there is no doubt that in the prevailing strategic circumstances the Allies were in an impossible situation, other air arms, operating in adverse circumstances were able to give a much better account of themselves before going to inevitable defeat. Finland in the Winter War and Continuation War and Germany in the final years of the war in Europe are examples. The reason for speed of the Allied collapse perhaps lies in their unreal assessments of their opponent. To develop effectively after World War I the Japanese air arms had been forced to open themselves to Western access and Western assessment. By 1931 the foreign perceptions were of two rival air forces - the JAAF and the JNAF - developed and trained by foreigners. They were equipped with foreign designed aircraft flown by second rate personnel. It was at that time that easy foreign access was to end, but a combination of factors was to ensure that these impressions were to remain dominant ones throughout the 1930s.

In the early 1930s the London Naval Treaty and the Manchurian and Shanghai crises led to a breakdown in the relationship between the air arms of Japan and the West. Simultaneously the Japanese need for Western advice had diminished as they applied the techniques slowly but steadily developed during the 1920s. As early as 1924, Sempill, who had been so critical in 1922, was to be far more complimentary of his erstwhile students.[65] However Sempill was now regarded with some reserve in Whitehall and there is some doubt that his reports were read.[66]

A British adviser appointed as an air fighting instructor in 1930-31 stated that:

> I heard many frequent discussions about torpedo bombing and knew that they were pretty well trained even then....I was of course never allowed to see them training in torpedo bombing.[67]

This is far removed from the intimate knowledge gained by the Sempill and Faure missions.

Japanese Secrecy

The Japanese went to great lengths to ensure that as little detail as possible of the advances made during the 1930s reached the Western powers and this was made easier in a population where Europeans were conspicuous and the popular slogan was that ‘every foreigner is a spy’.[68]

Okumiya and Horikoshi state:

> Our Navy’s chief training grounds were not in the homeland, but far at sea where even our own people remained unaware of the extent of our air-sea manoeuvres. Further, we concealed in every possible fashion the particulars of our military weapons and especially the performance of our aircraft. Foreign observers saw only what we allowed them to see.[69]

[65] Marder, *Old Friends, New Enemies,* pp 342-343.
[66] Ferris, ‘A British “Unofficial” Aviation Mission and Japanese Naval Developments 1919-1929’, p 426.
[67] Quoted in Marder, *Old Friends, New Enemies,* p 344.
[68] Francillon, Rene, *Japanese Aircraft of the Pacific War*, Putnam, London, 1970, p xi.
[69] Okumiya and Horikoshi, *Zero! The Story of the Japanese Naval Air Force,* p 58.

Courtesy ship visits were halted in 1936 and attache's movements were restricted. Press coverage of naval and military affairs was limited and Japanese officers did not speak freely to foreigners. The British Naval attache wrote:

It must be recognised that no officer under the rank of Admiral dare discuss any naval question with a foreigner. Some admirals are willing to talk about matters of general interest, but any approach to topics such as tactics or practices is met with a change of subject.[70]

By the 1930s Japan was a tightly controlled totalitarian state and its laws on secrecy were taken seriously and rigidly enforced.[71]

Western Intelligence Inadequacies

The Japanese were aided and abetted in this campaign of secrecy and misinformation by the inadequacies of Western intelligence. The British intelligence organisation in Singapore, the Far Eastern Combined Bureau (FECB), was controlled by the Admiralty and, within the limits imposed by the Japanese obsession with security, performed reasonably well in obtaining naval intelligence. However, it had less success in the field of air intelligence. Air Vice-Marshal Sir Paul Maltby, Assistant Air Officer Commanding, Far East Command, stated that in respect of air intelligence the FECB's development was backward and, in particular, the information it had collated for briefing crews was scanty. The intelligence collection system throughout the Far East was inadequate and unreliable.[72] Even when reliable information became available, dissemination techniques were poor. When accurate intelligence was obtained from China on the performance of the Zero fighter it was passed from the FECB to Headquarters, Air Command, Far East, but never reached the squadrons.[73] An RAAF aircraft recognition booklet promulgated in October 1941 has no reference to the Zero or, for that matter to the B5N, the JNAF's standard torpedo bomber.[74]

In late 1941, when the staff of Vice Admiral Sir Tom Phillips was considering the operation of the Force Z, comprising the capital ships *Repulse* and *Prince of Wales*, in the Singapore area it was calculated that the Japanese land based bombers would have an operating range of about 320 kms and that it would take considerable time to convert the Japanese twin engined bombers to torpedo bombers. The lack of information from Japanese sources forced them to base their calculations on the capabilities of European aircraft.[75]

In respect of the Japanese Army, and, by inference, the JAAF, a US Soldiers' Guide of 1942 stated that to attempt to estimate the Japanese Army was 'like attempting to describe the other side of the moon....It is incredible that a nation could have waged ten years of war and divulged so little'.[76]

[70] Quoted in Marder, *Old Friends, New Enemies*, p 334.
[71] Coox, *Rise and Fall*, p 85.
[72] Gillison, *Royal Australian Air Force, 1939-1942*, p 160.
[73] Shores and Cull, *Bloody Shambles*, p 40.
[74] Royal Australian Air Force, *Japanese Aircraft, Army and Navy*, Air Force Headquarters, Melbourne, October 1941.
[75] Marder, *Old Friends, New Enemies*, pp 416-418.
[76] Coox, *Nomonhan*, Volume 2, p 1079.

Distorted Racial Perceptions

Western perceptions of Japanese racial characteristics also played an important part in shaping assessments of the Japanese air threat. For centuries Western powers had come into conflict with the non-European races of the world and defeated them with superior military systems. They had colonised them and maintained their rule with a minimum of military force, governing with European derived administrative systems. After so long a period of successful colonisation the Europeans were firmly convinced of their moral and technological superiority over the Eastern races. It was difficult for them to accept that Asians could achieve any sort of military or technological parity.

In 1937 the First Lord of the Admiralty, Sir Samuel Hoare, stated that a fleet sent to the Far East would be slightly inferior to a Japanese Fleet but would prevail 'by relying on the superior fighting qualities of the British race'.[77] Examples of physiological characteristics attributed to the Japanese through racial ignorance are legion and often bizarre. Attitudes prevalent in *HMS Prince of Wales* in 1941 were typical. The Surgeon Lieutenant Commander of *Prince of Wales* recalled that the wardroom thought Japanese aircraft were made of cardboard and piloted by inefficient shortsighted pilots. They could not fly at night because they had an 'eye-fold'; nor could they navigate in the dark.[78]

Lack of intelligence combined with racial presumptions led to underestimation of Japanese technical capabilities. Rear Admiral Arthur McCollum, Head of the Far Eastern Section of the Office of Naval Intelligence of the United States Navy observed that Japanese technology was judged on the basis of Western technology and the assumption that Western technology was superior. Any report of a Japanese advance was considered wrong.[79] This attitude was not confined to American intelligence services. The Royal Navy, for example, considered that Japanese torpedo bombers were 'somewhat inferior to its early Swordfish' (the obsolete bi-plane torpedo bomber with which the Royal Navy's Squadrons were equipped).[80]

The best Japanese aircraft were thought to be designs of European origin rather than Japanese. United States pilots in the Philippines expected that the best aircraft they would encounter would be the German 'ME 109'.[81] Indeed, when action was joined Allied pilots in the Philippines and Malaya mistakenly reported combats with ME 109s and ME 110s because they thought that, in the absence if their own suitable aircraft, the Japanese would have to resort to foreign aircraft.[82] US intelligence reserved codenames for the German Bf 109, Bf 110, Fw 190, Ju 87B, Ju 88 and Ju 52.[83] Writing well after the war the RAAF official historian reported without comment that Japanese dive bombers were 'the Japanese version of the JU 87N'.[84] At

[77] Marder, *Old Friends, New Enemies*, p 353.
[78] *ibid.*, p 389.
[79] *ibid.*, p 354.
[80] *ibid.*, pp 389-390.
[81] Bartsch, *Doomed at the Start. American Pursuit Pilots in the Philippines, 1941-1942*, p 25.
[82] *ibid.*, p 76; and Shores and Cull, *Bloody Shambles*, Volume I, p 130.
[83] United States Navy, *Japanese Aircraft Manual*, Office of Naval Intelligence, Washington, December 1942, p 4.
[84] Gillison, *Royal Australian Air Force, 1939-1942*, p 279.

both Pearl Harbor and the Philippines the Japanese air threat was so discounted that the aircraft were lined up in the middle of the airfields to reduce the risk of sabotage.

The corollary of this ignorance was an overweening confidence in Western equipment. The Commander-in-Chief, Far East, Air Vice-Marshal Sir Robert Brooke-Popham, was twice to assure the Australian Government of the value of the Brewster Buffalo.[85] He declared publicly that 'we can get on all right with Buffaloes out here, but they haven't got the speed for England. Let England have the Super-Spitfires and the Hyper-Hurricanes. Buffaloes are good enough for Malaya'.[86]

Therefore by 1941 the last plentiful and reliable information about the Japanese air arms available to the Western powers was acquired before 1931. At that time the state of the JNAF, the JAAF and the Japanese aircraft industry throughout the preceding ten years was such that conclusions as to its limited efficiency were justified. Unfortunately these assessments were to remain basically unchanged. The significant improvements in capability resulting from war experience, greater recognition and encouragement by high command and improved technical skills were overlooked by Western analysts due to a combination of obsessive Japanese security, poor air intelligence and an inability to conceive that the Japanese had the ability to equal or surpass European technology and operational skills.

Between 7 and 10 December 1941, the Japanese air arms used long range bombers, operating beyond their expected range, to bomb Singapore and sink the *Repulse* and *Prince of Wales*. British air strength in Malaya was effectively neutralised and the outcome of the Malayan campaign assured. No assistance would come from the United States. The strategic mobility conferred on the JNAF by the large fleet carriers enabled it to destroy the American battle line at Pearl Harbor while the aircraft carefully drawn up in the middle of the Hawaiian airfields were mainly wrecks among the ruins of the airfield installations. The B-17s in the Philippines suffered a similar fate.

In the next few weeks, operating under the protective umbrella of the JNAF and the JAAF, the Japanese Navy and Army occupied Malaya, Singapore, the Philippines and the Dutch East Indies. The carrier force gave a virtuoso demonstration of mobile concentrated air power. After striking Pearl Harbor it moved rapidly from east to west, striking at Wake Island in passing. In the new year it supported the attack on Rabaul and other areas. On 19 February 1942 Darwin was savaged after which the force moved to the south of Java. After the fall of Java the carriers moved on to cause havoc in the Indian Ocean, raiding Ceylon and the Indian coast, sinking the cruisers *Cornwall* and *Dorsetshire* and the small carrier *Hermes* as well as lesser warships and merchant vessels. The British Eastern Fleet was forced to retreat ingloriously into the Indian Ocean. The smaller carriers and seaplane tenders covered the conquest of the Philippines and Dutch East Indies. The land based forces used techniques developed in China for rapidly occupying forward air bases as the enemy were expelled from them. This enabled air cover for the surface forces to be extended quickly, which in

[85] *ibid.*, pp 151-152, 170-171.
[86] Leasor, James, *Singapore, The Battle that Changed the World*, London, Hodder and Stoughton, 1968, p 161.

turn allowed the advance to maintain its momentum and keep the Allies continually wrongfooted.[87]

Equipped with only obsolete aircraft and shocked by their ineffectiveness against an air service whose capabilities had been so sadly underestimated, the Allies suffered one humiliating rout after another. All accounts of these operations speak of the demoralising and disruptive omnipresence of Japanese reconnaissance, fighter and bomber aircraft which could not be effectively countered. Doubtless the strategic realities prevailing in December 1941 would have led to the defeat of the Western powers in Asia. Nevertheless, their poor opinion of Japanese military capabilities, especially its air arm, was to contribute significantly to the cataclysmic suddenness of that defeat. The defeat need not have been so ignominious had there been a realistic appreciation of the relative strengths and weaknesses of the Japanese. It was just such an appreciation that enabled the US Navy to develop tactics which enabled their theoretically weaker F4F fighters to counter the Zero.[88]

PART IV – THE PACIFIC WAR: THE PROBLEMS COMPOUNDED

Japan entered the war with a strategy that reflected the narrow intellectual outlook of its high command. The strategy was simply to destroy quickly British, American and Dutch power in the Far East and secure a strong defended perimeter behind which Japan, with access to plentiful resources and protected transport routes, would prepare for a protracted period of self sufficiency. There would eventually be either a decisive battle in which the American fleet would be destroyed in Japanese waters or a negotiated peace. This strategic blueprint was not arrived at after well considered staff work but much of it was drawn up in only one month.[89]

Strategic Obduracy

The extraordinary success of their initial operations was to work heavily against the Japanese in the end. The territories occupied were far too large for each to be successfully defended but defended they were, for the warrior ethos attached a deep sense of shame to the idea of surrender. With the identification of the individual with the state and the armed forces with the Emperor, it was a logical step for the shame of personal surrender to translate to the shame of surrender of a portion of the Emperor's domain. The price of this strategic obduracy included the destruction of the JNAF and the JAAF in places far from the heart and nerve center of the Empire.

Valuable aircraft and pilots were lost at the Battle of the Coral Sea and at Midway, with heavy carrier losses at the latter. But it was the Allied offensive in the Solomons and the air attacks on the important Japanese base at Rabaul that led the JNAF to expose valuable pilots and aircraft to the superior numbers, technology and organisation of the American forces in a battle of attrition that it could never win.

[87] Woodburn Kirby, S., *The War Against Japan,* HMSO, London, 1957, Volume I, p 470.
[88] Lundstrom , John, *The First Team, Pacific Naval Air Combat from Pearl Harbor to Midway,* Naval Institute Press, Annapolis, 1984, pp 597-614.
[89] Toshiyuki,'Thoughts on Japan's Naval Defeat', p 504-505.

Rabaul was defended by carrier fighter units operating from land bases and their specific skills were lost in battle.[90] Losses amounted to no less than 70% of the Navy's experienced pilots, 'breaking the back of Japanese Naval air power, thus insuring the ineffectiveness of the Japanese Naval Air Forces in the area of operations of our Central Pacific forces'.[91] It was these Central Pacific operations which captured the islands, providing bases for the B-29 operations against the Japanese islands as well as bringing the aircraft of the American carriers within range of the homeland.

The defence of Rabaul might have been more efficiently carried out by Army pilots who did not have superfluous carrier skills but Rabaul was a Navy area of responsibility, the nearest JAAF units being based in New Guinea.[92] In any case the JAAF was having similar problems. Based at Wewak and Hollandia it was, like the JNAF, operating at the end of interdicted lines of supply, stubbornly refusing to surrender conquests before being forced into submission. By April 1944, when the Hollandia base was destroyed, the JAAF had been eliminated as an effective fighting force with 90% of its pilots with 300-600 hours flying experience lost and its technicians killed, captured or dispersed.[93]

Yet the strategy of defending every outpost of the empire to the end remained. Farflung subordinate theatres, such Burma and the Aleutians, took their toll. Even as the American bombers began their systematic destruction of the homeland cities and essential wartime industries, priority in fighter allocation was given to the lost cause of the Philippines.[94]

The failure to think through the consequences of their strategy and plan accordingly was to cost the Japanese dearly in merchant shipping and this was to impact severely on the air effort. The extent of their conquests meant that strategic materials had to be brought to Japan over extensive sea communications. Vast resources were invested in the construction of the Yamato Class battleships at the expense of other more essential vessels, especially carriers and escorts.[95] No emphasis was placed on a building programme for escorts to defend the supply lines between Japan and the outlying sources of strategic materials. Submarines were considered mainly as fleet vessels rather than as commerce destroyers.[96] Escort operations were not exercised prewar and an escort group was not formed until four months after the start of the war. It had only 24 heterogeneous vessels to guard the Empire's long sea lanes.[97] Only in 1944 did the Navy introduce an aircraft specifically for escort and anti-submarine work - the slow, poorly armed Q1W.[98] Yet it was the interdiction of the Japanese sea communications by American submarines which denied Japan the materials to build

[90] Overy, *The Air War, 1939-1945*, p 82.
[91] Anderson, O., 'Air War in the Pacific' in Eugene Emme, *The Impact of Air Power*, Van Nostrand, Princeton, 1959, p 291.
[92] Anon, *The Japanese Air Forces in World War II. The Organisation of the Japanese Army and Naval Air Forces, 1945*, Arms and Armour Press, London, 1979, p 5. (A Copy of a 1945 British intelligence document).
[93] Anderson, 'Air War in the Pacific', pp 291-292.
[94] US Army Forces Far East, Japanese Research Division, *Homelands Air Defense Operations Record*, Japanese Monographs No 157, Washington, 1946, p 26.
[95] Toshiyuki, 'Thoughts on Japan's Naval Defeat', p 509.
[96] *ibid.*, p 511.
[97] *ibid.*, p 511.
[98] Francillon, *Japanese Aircraft of the Pacific War*, pp 332-335.

aircraft and the fuel to fly them. As the American submarine offensive increased in tempo the Japanese were unable to replenish their diminishing stocks of materials so essential to aircraft manufacturing as cobalt, chromium, nickel, molybdenum and tungsten.[99] Despite the advances made by the air arm, the conservative battleship mentality was still very influential in the Imperial Japanese Navy.

Industrial Weaknesses

It was not possible for the Japanese to replace the lost men and aircraft. In this the warrior ethos played its part. War was thought of in strictly military terms - occupying territory and fighting battles. The role of industry and the economy in winning the war 'never clearly established itself in the mind of the Japanese Supreme Council'.[100] The Munitions Ministry, set up as an impartial coordinating body for industry, was undermined by sectional interests and was a failure.[101] Unimaginative and inefficient economic planning resulted. At joint conferences requests by civilians for allocations of manpower and materials tended to be overruled, even though the intended product might fill a service requirement.[102] The desire to maintain production for the decisive battle impaired the dispersal of factories.[103]

Manpower demands by the services were especially damaging to industry as the best workers were conscripted for military service without regard for skills or industrial requirements.[104] Conscription of industrial labour forced many small businesses to close and boosted the position of the larger companies, improving their ability to resist government directives if they so desired. Like other Japanese institutions, the family based companies focussed their loyalties inwards, and engaged in internecine rivalries in their business relationships. For example, Mitsubishi, the most important aircraft producer, was involved in a long standing feud with Mitsui who were connected with Nakajima.[105] From mid-1944 the loss of manpower in industry forced the conscription of schoolchildren over the age of ten to work in factories.[106] Strikes, absenteeism and shoddy work were chronic. Absenteeism was as high as 40% in some factories and 10% of all aircraft delivered to the services were defective.[107] Consequently, Japan's Gross National Product (GNP) for the first half of 1945 was 25% below its 1944 level.[108] US industrial output per worker hour was five times that of Japan.[109]

Japanese aircraft production figures provide eloquent testimony to Japan's industrial weakness. Even in 1941, with uninterrupted access to resources, Japan produced 5 088 aircraft, compared with 11 706 produced by Germany and 19 433 produced by

[99] *ibid.*, p 44.
[100] Calvocoressi, Wint and Pritchard, *op cit*, p 499.
[101] Francillon, *Japanese Aircraft of the Pacific War*, p 7.
[102] Calvocoriessi, Wint and Pritchard, *Total War, The Causes and Courses of the Second World War,* Vol II, *The Greater East Asia and Pacific Conflict*, p 501.
[103] Francillon, *Japanese Aircraft of the Pacific War*, p 501.
[104] *ibid.*, p 16.
[105] Thorne, *The Issue of War: States, Societies and the Far Eastern Conflict of 1941-1945*, p 254; Francillon, *Japanese Aircraft of the Pacific War*, p 2.
[106] Thorne, *The Issue of War: States, Societies and the Far Eastern Conflict of 1941-1945*, p 256.
[107] *ibid.*, p 256.
[108] *ibid.*, p 250.
[109] *ibid.*, p 252.

the United States. In 1944 the figures were, respectively, 28 180, 39 807 and 100 752.[110] Plans to produce 97 000 for the period January 1944 - August 1945 were reduced by economic circumstances to 66 000. Of these only 40 000 were built. Strategic circumstances confined most of this construction to fighters. Of 105 000 engines planned only 56 000 were built.[111]

The lack of resources meant a severe reduction in those that could be devoted to training. As a result the level of expertise declined dramatically from that of the first year of the war. By the end of the war Japanese pilots were entering combat with only 100 flying hours, compared with three times that in 1941.[112]

Aircraft Design Limitations

There was little civilian influence in the Japanese aircraft industry. Japanese aviation firms were joined by many designers with military backgrounds.[113] The Services stationed technical representatives and quality control inspectors in aircraft plants. They also acted as advisers, ensuring virtual service control of plant management.[114] They brought with them their conservative military outlook which became apparent in aircraft design. For example, the JNAF resisted Mitsubishi proposals to install a more powerful engine into the Zero until it was too late to bring the updated model into service.[115]

Japanese aircraft design emphasised characteristics such as range and manoeuvrability. These qualities were obtained through very light construction techniques making the aircraft very vulnerable to gunfire, especially as they lacked essential defensive measures such as armour and self-sealing fuel tanks. The Japanese lagged in the development of hydraulic and electrical systems and in the development of inline engines, those used in the Kawasaki fighters being developed from the German Daimler Benz DB 601.[116] With the exception of the Zero, the Japanese aircraft lacked firepower until later in the war. Nor did they have the same capacity for development as aircraft such as the Spitfire, Bf 109 or B-17.

The ever present Army-Navy rivalry compounded the problem. There was wasteful duplication of aircraft designs. Extraordinarily, the machine guns of the Japanese Army and Navy aircraft used different cartridges and their electrical systems used different voltages.[117] Army machine tools could not be used for naval construction and vice versa.[118] Each service controlled its own source of raw materials within its own sphere of influence.[119] The German Naval Attache in Tokyo noted that Navy and Army officers had no access to each other's development and manufacturing facilities

[110] Coox, *Rise and Fall*, p 90.
[111] Overy, *The Air War, 1939-1945*, p 93.
[112] Coox, *Rise and Fall*, p 90.
[113] Robert Mikesh and Shorzoi Abe, *Japanese Aircraft, 1910-1941*, Putnam, London, 1990, p 11.
[114] Francillon, *Japanese Aircraft of the Pacific War*, p 4.
[115] Green, William, *Warplanes of the Second World War: Fighters, Vol 3*, Macdonald, London, 1961, p 48.
[116] Mikesh, 'The Rise of Japanese Naval Air Power', p 111; Green, *Famous Bombers*, p 17.
[117] Overy, *The Air War, 1939-1945*, p 4.
[118] Francillon, *Japanese Aircraft of the Pacific War*, p 4.
[119] *ibid.*, p 5.

at the Nakajima plant.[120] Even their approach to aircraft development was different, the Army introducing too many types too soon while the Navy tended to stay with tried and true aircraft which had little further potential for development such as the A6M and the G4M.[121]

As the war progressed carrier aircraft designers were faced with pressures to increase fighter speed and manoeuvrability to enable them to be competitive with land based aircraft. As a consequence of their problems with engine development, Japanese designers chose to push their existing technology to its limit rather take the risks that US designers did by developing new powerful engines which permitted the introduction of faster, heavier, well protected fighters that outclassed their opposition in the Pacific campaigns.[122] This technological investment also produced the B-29 with its exceptional performance which made interception by the inadequate Japanese fighters extraordinarily difficult.

The Culmination - The Strategic Bombing of Japan

By late 1944 American aircraft were ranging freely over the Japanese homeland. The coming months would see appalling devastation and loss of life. The feeble Japanese response was the culmination of all those inefficiencies which were the hallmark of the Japanese air forces.

The air assault on the Japanese homeland highlighted Japanese planning deficiencies. Initially, homeland defence was to be based in the outlying bastions of China, Manchuria and the South Pacific as it was beyond Japanese resources to equip simultaneously the field forces and to provide effective defence of the homeland.[123] Consequently no attempt was made to establish an effective defence force and for two years it was based on training units equipped with unsuitable aircraft. In trying to fill two roles efficiently they performed neither adequately.[124] With the realisation that US air attacks on Japan were likely, the number of defensive aircraft and anti-aircraft guns were increased. However, the inevitable service differences were reflected in a decentralisation of air defence responsibilities. The Navy was responsible for the defence of the harbours and naval installations, the Army for the cities and industrial areas and the local commander for the defence of his airfield.[125] This was especially inefficient if all were collocated.

Technological inadequacies infected all components of the defence system. Although the Japanese were aware of the possibility of B-29 raids as early as 1943, efforts to organise a fighter defence against bombers operating at 20 000 feet were bedevilled by the lack of development of more efficient aircraft engines. To the Japanese, high altitude meant 25 000 feet and their engines were designed to give optimum performance at 15 000 feet. Consequently, Japanese aircraft had the greatest difficulty

[120] Krebs, G., 'The Japanese Air Forces' in Horst Boog (ed), *The Conduct of the Air War in the Second World War. An International Comparison,* Berg, Oxford, 1992, p 233.
[121] Francillon, *Japanese Aircraft of the Pacific War*, p 44.
[122] Hone and Mandeles, Interwar Innovation in Three Navies: US Navy, Royal Navy, Imperial Japanese Navy', pp 77-78.
[123] *Homeland Air Defence Operations Record,* pp 1-2.
[124] *ibid.*, p 7.
[125] *ibid.*, pp 9-11.

reaching the bombers and maintaining their height and aircraft balance. Only one pass was possible.[126] High altitude performance was gained by the use of maximum boost which caused malfunctions and increased the need for engine overhauls. Severe fuel limitations restricted the special training required for these missions.[127] The Japanese were forced into a position where aircraft armed heavily enough to destroy the B-29s could not reach them, while those with lighter armament and armour carried the double disability of vulnerability to the powerful defensive fire of the American bombers combined with insufficient firepower to achieve a kill.[128]

The warning system was woefully inefficient, relying on a system of visual lookout posts, radar and picket boats. Initially the visual lookout network was plagued by poor aircraft recognition skills, errors in estimating course and altitude and inefficient communications.[129] The radars were primitive, unable to pick up very high or very low aircraft or to determine height accurately.[130] The picket boats, originally deployed 1 000 kms offshore, were steadily pushed back by the US Navy.[131] Normally, the system required 75-85 minutes from first warning for a fighter to reach a position to attack the high flying B-29s. Within that time the American bombers were able reach and bomb their targets and be on the way out.[132]

Night flying instrumentation was makeshift and led to accidents with unqualified, untrained pilots, who were in a state of compounded exhaustion due to the pressures of training with scant resources.[133] Although a few nightfighters were equipped with radar 'there is no evidence that airborne radar played a central role in the occasional successes [achieved by Japanese nightfighters]'. Radio communication was chaotic and no ground control interception system existed.[134] The lack of resources caused by the American submarine campaign and the inefficiencies endemic in Japanese industry further contributed to the shambles of Japan's home defence. By 1 June 1944, only 750 aircraft and around 550 anti-aircraft guns were available. The aircraft numbers were made up by including aircraft from training and research establishments.[135] By March 1945, there were only 335 fighters available for home defence, augmented by 220 in training commands.[136] With the decline of oil shipments the Japanese were placed in the impossible position of finding enough fuel to train pilots in air defence techniques without handicapping air defence operations. However, only rigorous training would enable them to combat the B-29.[137]

[126] *ibid.*, p 27.
[127] US Army Forces Far East, Japanese Research Division, *Homelands Operations Record*, Japanese Monograph No 17, Washington, 1946, p 14.
[128] *ibid.*, pp 36-38.
[129] *Homelands Operations Air Defense Operations Record*, p 21.
[130] *ibid.*, p 22.
[131] *ibid.*, p 24.
[132] *ibid.*, pp 24-26.
[133] *ibid.*, p 15.
[134] Gunston, Bill, *Nightfighters. A Development and Combat History*, Charles Scribner's Sons, New York, 1976, p 132.
[135] *Homelands Operations Record*, p 17.
[136] *ibid.*, p 47.
[137] *Homelands Operations Air Defense Operations Record*, p 14.

To add to the inherent problems of the Japanese aircraft industry it was the primary target of the B-29s in the first months of the bombing offensive.[138] If Japanese aircraft production is represented by an index of 100 in 1941, it reached a peak of 600 by mid 1944 when the B-29 attacks commenced, then started a steep and immediate decline to 250 by the end of the war.[139] It is estimated that the raids cost 43% of engine production and a loss of 10 % in airframe output.[140]

CONCLUSION

In December 1941 the fighting qualities of the Japanese air arms were sufficient to inflict swingeing defeats on the unprepared Allies. Training, secrecy, mobility, doctrine and reasonably efficient aircraft took them to a succession of victories from Pearl Harbor to India. Their subsequent decline strikingly demonstrates that the successful exercise of power requires more than martial virtues. It depends upon an extensive and complex intellectual, technological and material infrastructure. Without these the Japanese were initially unable to develop a realistic strategy or critically assess their position as the war turned against them. To all intents and purposes the interdependence of the different branches of the armed forces and the synergy provided by their close cooperation was not understood and ignored. The Japanese were unable to compete technologically with their opponents and to a large extent the materiel in service in the JNAF and JAAF in 1945 was little advanced from that of 1940. The problem of bringing material resources from the Empire to Japan was insufficiently addressed with the vigour it demanded, nor was the problem of efficient used of available resources.

Much of the Japanese inefficiencies stemmed from the assumptions of the culture prevailing in Japanese society. The same might be said for the Western powers in the early days of the war. Nevertheless the West had the intellectual flexibility and access to resources and technology to destroy the Japanese military machine. (In writing this the author is not unaware of his own cultural milieu.) By late 1944 all that was left to Japanese forces was their warrior ethos and this was called upon to inspire the *kamikazes*. This sacrifice of men flying obsolescent aircraft into the teeth of Western technology in an attempt to drive it from the coasts of Japan by demonstrating moral superiority was the ultimate manifestation of the forces that shaped the Japanese air forces and the desperate plight which they produced.

[138] Hansell, H.S., *Strategic Air War Against Japan,* Air War College, Maxwell Air Force Base, 1980, p 52.
[139] US Strategic Bombing Survey, quoted in *ibid.*, p 59.
[140] Francillon, *Japanese Aircraft of the Pacific War*, p 11.