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Blinded by the Rising Sun? American Intelligence Assessments of Japanese Air and Naval Power, 1920-1941

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Blinded by the Rising Sun? American Intelligence Assessments of Japanese Air and Naval Power, 1920-1941

by

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Abstract

This thesis evaluates American intelligence assessments of Japanese air and naval power during the interwar period. All issues from the assessment of personnel, tactics and technology, to strategy and industry are addressed together. American assessments of Japan's poor strategic and industrial position remained highly accurate, while assessments of Japanese tactics and technology were flawed. Since the Americans planned to fight a prolonged war of attrition, strategic and industrial assessments proved far more critical than those which assessed low level issues. Their conclusion was that Japan could not win a war against the United States. Errors in the assessments of Japanese technology and tactics contributed to the shock and embarrassment of the early defeats in the Pacific War, but were not the main cause of those defeats. The underestimation of Japanese air power did more damage to the Americans than the middling assessments of Japanese naval power.

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Table of Contents

List of Symbols, Abbreviations and Nomenclature

Symbol	Definition
AA	Anti-Aircraft
IJA	Imperial Japanese Army
IJAAS	Imperial Japanese Army Air Service
IJN	Imperial Japanese Navy
IJNAS	Imperial Japanese Navy Air Service
MID	Military Intelligence Division
NGS	Imperial Japanese Navy General Staff
ONI	Office of Naval Intelligence
RAF	Royal Air Force
ROCAF	Republic of China Air Force
USN	United States Navy

CHAPTER 1: INTRODUCTION

The IJA and IJN spent the interwar years developing the air and naval power which they would use against the United States during the Pacific War. After 1918, American authorities identified Japan as a primary rival, and focused most of their intelligence gathering efforts on the East Asian nation. This information then was used to assess the threat that Japan's military posed to the United States. Many American intelligence officers were assigned to Japan to observe military developments. They spent several tours in Japan over their career to learn the language and then to serve as intelligence officers in Washington or as an attaché at the American embassy in Tokyo. The attachés became the most important source of information on the Japanese military. This system had strengths and shortcomings. For example, the United States Army's MID never sent an assistant military attaché for air matters to Japan. Instead, an infantry or artillery officer was left to observe the two Japanese air services.[1] The nine naval attachés who served in Japan through the interwar years faced similar difficulties. They did not receive the specialised training required to identify subtle changes in Japanese naval doctrine and technology, though the USN eventually did assign an assistant naval attaché for air matters.[2]

The literature concerning interwar intelligence assessments of Japanese naval and air power is small and falls into three main bodies. The first group either discusses intelligence generally, or acknowledges intelligence assessments in passing while addressing the military history of the Pacific War. Before 1990, this literature traditionally argued that racism was central to American assessments, and thus that their accuracy was poor. David Kahn argues that

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[1] Thomas G. Mahnken, *Uncovering Ways of War: U.S. Intelligence and Foreign Military Innovation, 1918-1941* (Ithaca: Cornell University Press, 2002), 43-46.
[2] Douglas Ford, *The Elusive Enemy: U.S. Naval Intelligence and the Imperial Japanese Fleet* (Annapolis: Naval Institute Press, 2011), 20.

"intelligence had little to do with American assessments of...Japan before December 1941." Instead, "racism and rationalism" clouded the judgement of American observers.[3] This argument is best articulated by John Dower in his famous work on race and the Pacific War. While he briefly acknowledges that some observers set aside their racial prejudices, the overwhelming racism of the American military hindered the reporting of accurate information. This "contempt for Japanese capabilities," Dower claims, caused disasters which possessed the "overtones of a black, contemporary morality play."[4] Western intelligence assessments were "prejudice masqueraded as fact," and constantly reinforced the notion that the Japanese "could neither shoot, sail, nor fly."[5] Challenges to this simplistic view began to emerge in the late 1980s and throughout the 1990s as scholars dove deeper into the tens of thousands of intelligence reports available in archives around the world. John Ferris started this shift. He espoused a nuanced view that acknowledges the presence of racism in analysis, but identifies it as only one factor among many which shaped assessments of the fighting capabilities of a given nation. He emphasises differences in interpretation between national and functional services, and the striking accuracy of many assessments of the IJA, compared to systematic tendencies to underestimate the high technology branches of the Japanese military.[6]

The second body of literature involves in depth looks at assessments of Japanese air power. One of the first articles to challenge the prevailing view that American intelligence was

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[3] David Kahn, "United States Views of Germany and Japan in 1941," in *Knowing One's Enemies: Intelligence Assessment before the Two World Wars*, ed. Ernest R. May (Princeton: Princeton University Press, 1986), 476.
[4] John W. Dower, *War without Mercy: Race and Power in the Pacific War* (New York: Pantheon Books, 1986), 99.
[5] Ibid., 102.
[6] For a general description of the factors which influenced intelligence assessments in the interwar period, see John Ferris, *Intelligence and Strategy: Selected Essays* (New York: Routledge, 2005); John Ferris, "'Worthy of Some Better Enemy?': The British Estimate of the Imperial Japanese Army, 1919-1941, and the Fall of Singapore," *Canadian Journal of History* 28:2 (1993): 223-256.

terribly flawed was written by William Leary in 1987. He uses specific examples, most notably the case of the A6M ('Zeke'/'Zero'), to demonstrate that American observers were not nearly as blind to the achievements of Japanese air power as previously assumed. His work, like that of other earlier articles in this new school, focused almost exclusively on technology and tactics.[7] A.D. Harvey's *Army Air Force and Navy Air Force: Japanese Aviation and the Opening Phase of the War in the Far East* expands on Leary's arguments by assessing the tactics and technology of the IJNAS and IJAAS at the start of the Pacific War. He concludes that dismissal of the tactical and technological capabilities of the Japanese air services by interwar western observers was mostly justified. While the main thrust of this argument has merit, it is undermined by many oversimplifications, misunderstandings and factual errors. One such problem is the gross oversimplification of how the speed of different aircraft compare to one another.[8] The maximum speed and general engine performance of an aircraft can vary wildly depending on altitude. The list of technical characteristics that must be understood to compare two aircraft is extensive. One cannot pick and choose which characteristics to assemble into a list devoid of context.[9] Harvey's work reveals the danger of basing an argument around technology and tactics without understanding the fundamental basics of either matter.

The best work on Anglo-American assessments of Japanese air power is written by Greg Kennedy. Instead of fixating on technology and tactics, he stresses the importance that industrial and strategic issues played in western assessments of the strength of Japanese air power. This

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[7] William M. Leary, "Assessing the Japanese Threat: Air Intelligence Prior to Pearl Harbor," *Aerospace Historian* 34:4 (1987): 272-277. The IJN short designation system and IJA Kitai numbering system will be used throughout this work unless the aircraft in question is more famously recognised by its name, such as the Zero.
[8] A.D. Harvey, "Army Air Force and Navy Air Force: Japanese Aviation and the Opening Phase of the War in the Far East," *War in History* 6:2 (1999): 179.
[9] *Fighter Combat Comparisons No. 1: Grumman F6F-5 Hellcat vs. Mitsubishi J2M3 Model 21 Raiden ('Jack')* (Teaneck: Tacitus Publications, 1989), 2.

level of analysis was ignored or underplayed by previous works on the subject. Kennedy concludes that the overall Anglo-American assessment of the Japanese air services was correct and "to see…low-level success as demonstrative of the overall ability of Japan to manifest effective, modern air power is to misunderstand fundamentally the core attributes of air power."[10] Instead, the most important factor was Japan's inability to maintain the quality and quantity of its air power over a prolonged campaign of attrition.

The final body of literature addresses American assessments of the IJN. This topic has been addressed less than assessments of Japanese air power, and historians have focused almost exclusively on technology and tactics. Malcolm Muir Jr. wrote an excellent article on American efforts to discover the characteristics of the *Yamato*-class battleships, but the extremely tight focus on one technical issue left plenty of avenues to be explored.[11] John Prados briefly mentions American assessments of the IJN's technological capabilities in his work, *Combined Fleet Decoded: The Secret History of American Intelligence and the Japanese Navy in World War II*. While his account is accurate, it is limited. There are few specific examples and virtually no analysis. Instead, the topic is handled in passing.

Douglas Ford and Thomas Mahnken have written the best treatments of American assessments of the IJN. Mahnken's excellent work focuses on the role of technological and tactical innovation in assessing a nation's military capabilities. His chapter on Japan is superb, but specifically addresses the IJN in only a handful of pages, leaving little space for in depth analysis. Mahnken emphasises the phenomenon of mirror imaging, where one's own capabilities

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[10] Greg Kennedy, "Anglo-American Strategic Relations and Intelligence Assessments of Japanese Air Power, 1934-1941," *The Journal of Military History* 74:3 (2010): 772.
[11] Malcolm Muir Jr., "Rearming in a Vacuum: United States Navy Intelligence and the Japanese Capital Ship Threat, 1936-1945," *The Journal of Military History, 54:4* (1990): 473-485.

and methods are imposed on the adversary. He also cautions against explaining all intelligence failures as the result of ethnocentric or racist ideas. Other factors, like Japanese secrecy and rapid changes in technology throughout the period, also shaped failures of assessment.[12] Ford follows this set of arguments in *The Elusive Enemy: U.S. Naval Intelligence and the Imperial Japanese Fleet*, which contains one small chapter on American intelligence assessments of the IJN in the interwar years. Ford focuses on technology and tactics, but he also addresses strategic and industrial assessments. His main addition to the literature is that assessments of Japan's strategic and industrial weaknesses, accurate as they were, contributed to the American dismissal of the IJN's capabilities.[13]

This work seeks to combine the discussion of all levels of assessment of both Japanese air and naval power for the first time, adding nuance and expanding on the excellent work of scholars like Ferris, Kennedy and Mahnken. When viewed together, American assessments of Japanese air and naval power throughout the interwar years remained highly accurate while addressing strategic and industrial issues, but underestimated the tactical and technological competence of the Japanese air services and the IJN. This failure contributed to the initial shock regarding the quality of these branches of the Japanese military at the start of the Pacific War, and to some of the tactical successes achieved by the Japanese in 1941-1942. The main cause of such failures in low level assessments, however, was not racism, but intense Japanese secrecy, particularly after the start of the war in China. This secrecy forced the Americans to rely

[12] Mahnken, *Uncovering Ways of War*, 84.
[13] Douglas Ford, *The Elusive Enemy: U.S. Naval Intelligence and the Imperial Japanese Fleet* (Annapolis: Naval Institute Press, 2011), 15.

increasingly on preconceived notions, ethnocentrism and mirror imaging rather than hard evidence.

Assessments of Japanese air power passed through three distinct phases. During the 1920s, American observers maintained an accurate picture of Japanese capabilities. Japan was largely an open society, and its air services depended on western assistance, meaning the Americans were able to track major developments. Assessments focused on Japan's inability to wage a protracted war of attrition in the air. Opinions of Japanese personnel were low and their dependence on foreign technology was constantly emphasised. The early and mid 1930s was a transition period from the Japanese openness of the 1920s and the extreme secrecy which characterised the period from 1937 onward. American assessments of the strategic and industrial elements of Japanese air power remained correct, but the accuracy of assessments concerning Japan's technology and tactics began to slide. Views of Japanese personnel became so contradictory as to be almost worthless. With the start of the war in China, the Americans were almost completely in the dark regarding assessments of the technology, tactics and personnel of the Japanese air services. Japanese information security was tight and American observers received little information with which to form educated opinions. The Americans relied heavily on the dated concept that Japan's air services could not innovate technologically or tactically, something which had been untrue since the mid 1930s. Assessments of Japanese personnel began to rely on dated and negative conclusions from the 1920s. Ethnocentrism began to creep into such reports. Despite the lack of information about tactics and technology, American observers accurately assessed the strategic and industrial limits of Japan's air power. Success with these higher level assessments ultimately mattered more than the mistakes made while assessing technology and tactics.

Unlike air power, American assessments of Japanese naval power remained consistent throughout the interwar period. They never reached the dizzying heights of assessments about air power from the 1920s, nor the sickening lows in assessments after 1937. Instead, assessments of the IJN were consistently mediocre. Mirror imaging was common regarding technology and tactics, which led to large miscalculations in some areas and reasonable assessments in others. IJN personnel were seen as competent, despite the ethnocentrism appearing in many of the reports. As with air power, errors in assessments regarding low level issues shaped the failures to assess Japanese capabilities in the first months of the Pacific War. However, these failures were nullified over the long term due to the accuracy of high level assessments which highlighted Japan's inability to win the kind of protracted war of attrition the Americans intended to fight.

CHAPTER 2: AMERICAN INTELLIGENCE ASSESSMENTS OF JAPANESE AIR POWER IN THE 1920S

Throughout the 1920s the Japanese worked rapidly to catch up with the developments of western powers in the field of military aviation. During this period, American intelligence assessments remained accurate at all levels, from personnel, tactics and technology to industry and the scarcity of raw resources. The openness of the country let the Americans follow any important developments. American observers quickly identified Japan's heavy reliance on foreign assistance and the weakness of its aviation industry, while the quality and quantity of Japanese aviation personnel and aircraft were carefully tracked. A lack of innovation in Japan's aviation industry was constantly emphasised and military aviation personnel were seen as inferior to their western counterparts. As throughout the entire interwar period, the assessments primarily addressed Japan's ability to wage a protracted war of attrition in the air, rather than focusing on low level tactical and technical capability. Racism played a negligible role in the reporting of Japan's aviation developments during the 1920s and other issues which can impact intelligence assessments, such as preconceived notions and mirror imaging, were entirely absent. Ethnocentrism did appear in the language of some reports, particularly where personnel were concerned, but it did not degrade the observers' ability to rationally assess the strengths and weaknesses of Japanese air power.

The accuracy of American assessments in the 1920s was due in large part to openness within Japan. Letters were constantly sent back and forth between the American naval attaché in Tokyo and the Japanese Navy Ministry. The letters requested information about the organisation of the IJNAS, the numbers of available aircraft and the number of existing and planned naval air

stations among other topics. The Navy Ministry answered these letters in full.[14] All the Americans had to do in order to obtain such pertinent information was to ask. In one incident the naval attaché in Tokyo, frustrated with a vaguely worded and "unsatisfactory" letter from the Japanese Navy Ministry, requested a meeting with a Japanese officer to clarify their answers. During the meeting the naval attaché realised that he had misunderstood the letter because he misconstrued how the IJNAS organised their units, while the Japanese themselves were "a little embarrassed" about exposing how weak their naval air power was. For example, when asked in the original letter how many reserve personnel they possessed the Japanese Navy Ministry had answered that "it is difficult to express it in figures." In the meeting the Japanese officer told the naval attaché that the difficulty was that the IJNAS did not have any reserve personnel. He then expressed interest in exchanging photographs of all ships and aircraft then in service.[15] The ease with which the American naval attaché obtained large amounts of information through direct communication with the Naval Ministry was remarkable, but the openness of the Japanese was not limited to such communication.

Tours of aircraft manufacturing facilities and air stations were open and casual. The Americans were not rushed through important areas and were free to speak to Japanese workmen, mechanics and designers. The level of detail in an extensive report on Japanese aircraft factories from 1925 shows lax Japanese information security. Minor technical details and factory layouts were abundantly described throughout the report, revealing the high level of access Americans had at the facilities. Japanese workmen and designers were extremely

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[14] A-1-u 17242, "Letter to Captain K. Terashima, I.J.N.," January 27 1925, *Naval Attaché Reports, 1886-1939,* Box 142, Record Group [RG] 38, National Archives and Records Administration [NA], Washington, D.C.; A-1-u 17242, "Information on Air Services," March 5 1926, *Naval Attaché Reports, 1886-1939*, Box 142, RG 38, NA.
[15] A-1-u 17242, "Letter to Mr. McClaran," February 10 1925, *Naval Attaché Reports, 1886-1939*, Box 142, RG 38, NA, 1-2.

forthcoming when asked direct questions about their work.[16] Another report stated that the Japanese informed western observers that a new branch factory of Nakajima, a major aircraft manufacturer, had been completed and was producing foreign aircraft engines. It listed the number and type of all the aircraft available to the IJNAS, noting that the information likely was accurate since all naval air stations were toured extensively and observers were even allowed to enter the hangers to see aircraft.[17]

Japan's reliance on foreign assistance allowed the Americans to keep pace with Japanese technological and industrial advances. A report in 1924 stated that Japan always sought out the best foreign designed aircraft that it could purchase, and copied these models, along with the methods of production used to create them. The Japanese air services were also modelled after what the Japanese thought were the most advanced foreign air forces.[18] This observation would persist through to the beginning of the Pacific War, when it was a mistaken notion. In the 1920s, however, Japan did seek to develop its air power by following in the footsteps of the world leaders. For example, in 1919 the IJNAS only possessed 32 aircraft, all of foreign origin.[19] In addition to weaknesses in materiel, Japan also lacked pilots, gunners, navigators, ground crews, aircraft manufacturers and designers.[20] Overall, Japan was six years behind western aviation technologically, industrially and tactically. Naturally, the IJN turned to Britain for assistance

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[16] A-1-u 17242, "Visit to Aircraft Factories," May 15 1925, *Naval Attaché Reports, 1886-1939*, Box 142, RG 38, NA.
[17] A-1-u 17242, "Aviation," July 21 1925, *Naval Attaché Reports, 1886-1939*, Box 142, RG 38, NA, 1-2.
[18] 2085-630, "Extracts from Report of Inspection of United States Possessions in the Pacific and Java, Singapore, India, Siam, China, & Japan," October 24 1924, *US Military Intelligence Reports, Japan, 1918-1941*, Reel 28, University Press of America, 1.
[19] John Ferris, "A British 'Unofficial' Aviation Mission and Japanese Naval Developments, 1919-1929," *Journal of Strategic Studies* 5:3 (1982): 418.
[20] Mark R. Peattie, *Sunburst: The Rise of Japanese Naval Air Power, 1909-1941* (Annapolis: Naval Institute Press, 2001), 18.

with the fledgling IJNAS.[21] The British agreed to provide extensive assistance based on the assumption that the Japanese could only copy foreign equipment, not improve on it.[22] By the time the Sempill Mission concluded, Japan had been given knowledge of the most advanced aerial tactics and been shown the newest technology in the field except for aircraft carriers.[23] The British aviation mission sent Japan laid the foundation which the Japanese would use to expand and improve the IJNAS.

Many American assessments implied that copying from the best was a flawed method of developing air power. Ford accurately emphasises that this practice actually was a strength. The IJN would collect the best examples of equipment it could find, and adapt them to its own operational concepts.[24] Copying from the best was a far better way to develop effective air power than attempting to create an industrial base and designs indigenously from the start. Americans noted that Japanese progress in aviation was "phenomenal," but limited by the lack of raw materials within their own country.[25] Ford believes that this "popular misconception" in American assessments led them to believe Japan could not challenge the United States.[26] This view, however, was not a misconception, but an accurate conclusion drawn from the observation of Japan's dependence on imports to feed its war industry. If Japanese industry was starved of imports, it could not maintain an industrialised air war against the United States.

The naval attaché in Tokyo constantly emphasised the inability of the Japanese to design and build aircraft without extensive foreign aid. After inspecting Japanese aircraft factories, he

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[21] Ferris, "A British 'Unofficial' Aviation Mission and Japanese Naval Developments, 1919-1929," 418.
[22] Ibid., 421.
[23] Peattie, *Sunburst*, 20.
[24] Ford, *The Elusive Enemy*, 23.
[25] 2085-630, "Extracts from Report of Inspection of United States Possessions in the Pacific and Java, Singapore, India, Siam, China, & Japan," 6.
[26] Ford, *The Elusive Enemy*, 17.

concluded that they had yet to produce any indigenously designed aircraft or engines "of any value whatsoever."[27] The Japanese Navy Ministry had only one type of metal seaplane, a licensed copy of a western design, which the naval attaché considered modern and useful militarily.[28] The report offered an extensive and technically detailed list of the most modern aircraft in service with the IJAAS.[29] The views and tone put forward in this report was common among both American naval and army intelligence during the 1920s. It presented a balanced opinion of the Japanese air services' limited technological capabilities.

A later report turned its attention to the inferior production methods of Japan's major aircraft manufacturers. Most of the machine tools in the factories were of American manufacture and the machine shops themselves were crowded, which led to inefficiency within the production process.[30] A reliance on foreign, particularly American, machine tools was obviously a grave weakness in Japan's aviation industry if the nation went to war with the United States. Production was extremely slow, particularly when a factory was ordered to manufacture new types of aircraft. The retooling and learning process was much longer than in an American factory, and the manufacturing was interrupted for a significant amount of time before normal production was achieved once again. During this process, foreign workmen always were employed to ensure a smoother transition.[31] Not only was the Japanese aviation industry out produced by the Americans, it was much less prepared to move smoothly to the manufacture of new aircraft once a design was ready for serial production.

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[27] A-1-u 17242, "Japanese Air Strength," May 5 1925, *Naval Attaché Reports, 1886-1939,* Box 142, RG 38, NA, 3.
[28] Ibid., 5.
[29] Ibid., 9.
[30] A-1-u 17242, "Visit to Aircraft Factories," 1.
[31] Ibid., 8.

The inability of the Japanese aviation industry to rapidly turn existing factories over to produce new models of aircraft persisted into the Pacific War. It undermined Japan's ability to keep pace both qualitatively and quantitatively with their western foes. Much ink has been spilled discussing the aircraft which Japan developed in the late 1930s through to the beginning of the Pacific War, but almost no works detail Japan's wartime designs, because Japanese industry failed to quickly switch production to new airframes and engines. The J2M Raiden ('Jack'), an excellent interceptor designed for the IJNAS, first flew in March 1942, nearly three months ahead of the F6F Hellcat prototype's first flight. Despite this, the first production Hellcat was completed in the same month in which the J2M had only just been accepted for serial production. Six months later only 14 J2Ms had been delivered at a time when Hellcats leapt off the American production lines.[32] Production of the army's Ki-61 Hien ('Tony') fighter took almost two years to reach a paltry 100 units per month.[33] The American ability to rapidly retool factories so to produce newer airframes and engines provided a great advantage as the war progressed. It could rapidly supplement America's existing aircraft types, like the F4F Wildcat, with entirely new generations of better aircraft. Meanwhile the Japanese air services were, for the most part, forced to make do with upgrades of existing and increasingly obsolete designs. The IJAAS was more successful than the IJNAS on this front as the Ki-43 Hayabusa ('Oscar'), the main army fighter at the beginning of the Pacific War, was replaced in almost all frontline units with modern aircraft types before the end of the war.[34] However, when the production figures for 'second generation' American naval fighters *alone* are compared to the total modern fighter

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[32] *Fighter Combat Comparisons No.* 1, 13.
[33] Eric M. Bergerud, *Fire in the Sky: The Air War in the South Pacific* (New York: Basic Books, 2009), 223.
[34] René J. Francillon, *Japanese Aircraft of the Pacific War*, 2nd ed. (London: Putnam Aeronautical Books, 1979), 213.

production for *both* the IJNAS and IJAAS the disparity is sobering. 23,505 Hellcats and F4U Corsairs (all models) were produced between 1942-1945 against only 9,793 N1K Kyōfū/Shiden ('Rex'/'George'), J2Ms, Ki-44 Shōki ('Tojo'), Ki-61s, Ki-84 Hayate ('Frank') and Ki-100s ('Tony') (all models).[35] The Japanese could not match the production of one branch of the US military. American assessments almost twenty years earlier accurately identified this weakness.

A French report from October, 1925 offered similar assessments of the Japanese aviation industry. The materiel used by the IJAAS and IJNAS were French and British in origin, either constructed abroad, or built under license within Japan itself, with the aid of foreign engineers.[36] This reliance on foreign materiel and brains let foreigners easily track the types of aircraft used by the Japanese at any time. Japan's technological progress in aviation could be monitored by interviewing members of the western aviation industry who were invited to Japan to offer technical assistance. Thus Dr. Rohrbach, a prominent designer of metal aircraft during the 1920s, who returned from Japan after providing such assistance, supplied ONI with extensive technical details of various aircraft and engines which the Japanese were seeking to produce under license.[37] Detailed reporting of Japanese aviation technology was a staple of 1920s assessments, where the Americans continuously listed specific aircraft types in use with the IJAAS and IJNAS, and their performance characteristics.

Despite Japan's reliance on foreign assistance, the French report was impressed with the progress Japan had made, particularly in industry. The construction of engines, radiators,

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[35] *Fighter Combat Comparisons No. 1*, 21; Ibid., 120, 134. 'Second generation' fighters had entirely new airframes or, in the case of the Ki-100, a more powerful and reliable engine that matched other contemporary designs. These developments required factories to stop existing production, retool facilities and retrain workmen.
[36] 2085-659, "Translation from L'aeronantique, (Paris) No. 77," October 1925, *US Military Intelligence Reports, Japan, 1918-1941*, Reel 28, University Press of America, 11.
[37] A-1-u 17242, "Japanese Naval Aviation," May 21 1925, *Naval Attaché Reports, 1886-1939*, Box 142, RG 38, NA.

propellers and airframes all were advancing and there were signs of Japanese innovation when it mentioned a new type of rudder which had been patented by a lead designer named Nakagawa.[38] The assessment of the Japanese offered a balanced view. It emphasised the materiel and industrial weaknesses in Japanese aviation, but also the forward strides made over a short period of time.

A general summary from 1927 discussed Japanese materiel. All Japanese aircraft were of foreign design, with approximately half having been built in Japan. The report noted that simple observation could not distinguish between the aircraft built in France and Japan. This implied that the Japanese could build copies of foreign designs with nearly identical craftsmanship. These aircraft were underpowered and inferior to contemporary American designs, but the Japanese knew of this deficiency and were striving to correct it.[39] Due to its imitative nature Japanese air power was three years behind the leading western powers in the development of engines and airframes. Export models of military equipment are rarely the equal of materiel the exporter keeps for itself. Reliance on importing technology meant, by definition, that Japan was trailing in this area. The Japanese were moving away from importing equipment itself, opting instead to manufacture it locally, but still relied on importing "brains instead of equipment."[40] If current trends continued, Japan could not compete against the air power of the major European powers and the United States for 20 years.[41] Japanese aviation was "backward" despite having pursued it for 15 years. This general summary provided a fairly negative assessment, but never used racist explanations for the weaknesses in the Japanese system. In fact, the report ended with

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[38] 2085-659, "Translation from L'aeronantique, (Paris) No. 77," 19.
[39] 2085-663, "General Summary Japanese Air Service," June 1 1927, *US Military Intelligence Reports, Japan, 1918-1941*, Reel 28, University Press of America, 8.
[40] Ibid., 9.
[41] Ibid., 11.

a hypothetical scenario in which Japan significantly improved its air services so that they could defend the Japanese home islands.[42] The result underlined the weaknesses of Japanese aviation, but also accepted the possibility that it could improve exponentially in coming years.

The opinion of Japanese personnel was low, but remained balanced. A memorandum sent to Major Baldwin held Japanese airmen and officers in high regard, referring to them as "well disciplined."[43] Most officer and non-commissioned officer pilots were described as "good," but not remarkable. This assessment was reasonable, as the Japanese were newcomers to the field of aviation, without experience from the First World War. Therefore, the first pilots Japan produced probably would be merely competent rather than noteworthy. The report also noted that the work of the mechanics was "most praiseworthy" and their tools were "well cared for."[44] Despite the severe deficiencies in the Japanese aviation industry, the naval attaché also commended the workmen and mechanics at several factories.[45] His assessments of Japanese pilots were more critical. One report concluded that the Japanese have a "fair ability" as pilots, but were rated poorly in all around efficiency.[46] The British aviators who had trained the IJNAS in the early 1920s informed the American naval attaché of their low opinion of Japanese personnel.[47] Another report noted that the pilots and aircraft nominally attached to *Hōshō*, Japan's first aircraft carrier, were in fact based and trained exclusively at an airfield on land. A wooden platform laid out to simulate the deck space of *Hōshō* was used for simulating carrier landings.[48]

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[42] Ibid., 13-14.
[43] 2085-647, "Memorandum for Major Baldwin," September 30 1926, *US Military Intelligence Reports, Japan, 1918-1941*, Reel 28, University Press of America, 3.
[44] Ibid., 6.
[45] A-1-u 17242, "Visit to Aircraft Factories," 5.
[46] A-1-u 17242, "Japanese Air Strength," 3.
[47] Mahnken, *Uncovering Ways of War*, 73.
[48] A-1-u 17242, "Japanese Air Strength," 8.

This procedure removed the "naval" elements from training, such as landing on a moving carrier at sea. The overall conclusion was that Japanese naval aviation would take years before it could be favourably compared to its American counterpart.[49] This view was shared by Colonel Faure, head of the French Military Aviation Mission to Japan which had trained the pilots of the IJAAS during 1919. He pointed out that the Japanese lost a large number of aircraft in training accidents, particularly in the IJNAS. This was seen as a "weak point" in Japan's aviation services, though Faure also made it clear that Japan was not far behind the west.[50] The implication was Japanese pilots were of such poor quality that they destroyed their own equipment at a higher rate than other air powers. Conspicuous by its absence was any notion of the inferiority of the Japanese race despite the harsh criticism levelled against Japanese pilots. The assessments rested on rational observation rather than any preconceived notion of racial characteristics.

The most noteworthy weaknesses which the Americans saw in Japanese aviation personnel were the lack of pilot training and reserves. In an information bulletin detailing the Japanese Diet's 1924 budget for naval aviation, the naval attaché in Tokyo noted that the IJNAS had no reserve personnel at all.[51] Another report stated that, "there are three schools of aviation, but only <u>one</u> army flying training school."[52] The author deemed the existence of only one army flight training school important enough to be underlined for emphasis. He detailed the number of pilots available to Japan, along with the number of factories which manufactured aircraft engines

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[49] Ibid., 9.
[50] A-1-u 17242, "Aviation," 3.
[51] A-1-u 17242, "Data for Congressional Hearing; Additional Detailed Information on Air Services," February 9 1925, *Naval Attaché Reports, 1886-1939*, Box 142, RG 38, NA, 2.
[52] 2085-719, "Information as to Japanese Aviation," February 9 1927, *US Military Intelligence Reports, Japan, 1918-1941*, Reel 28, University Press of America.

and airframes. American reports assessed the ability of Japan to fight a protracted air campaign, where production figures and the number of available pilots mattered more than the quality of individual aircraft.

A general summary of the Japanese air services of June 1, 1927 questioned the flying experience of the officers, and described the flying seen in Japan as "characterized by timidity and one could not help but feel that dash and spirit were lacking."[53] The author claimed that he could find nothing else to criticise other than the flying when discussing the quality of Japanese pilot schools. This was a strange statement to make considering the purpose of a flight school was to train recruits to handle aircraft. If the flying was poor then it brought the quality of the school itself into question. The summary stated that the poor flying was caused by Japanese pilots who spent too much time in the classroom and not enough in the air.[54] These criticisms were valid as a lack of flight time can kill any pilot, particularly one in combat. The observations also revealed that the Japanese air services were still in their infancy, and would take years before they could challenge the western powers. The report highlighted this exact position when it described the IJAAS and IJNAS as being in "an elementary stage of development. None of them are capable of combat with well developed aviation, *considering factors other than equipment* (emphasis added)."[55] Again, American assessments stressed the importance of broader factors beyond the quality of aircraft.

Throughout 1927 and 1928, assessments of Japanese air power remained, for the most part, balanced and accurate. The reliance on copies of obsolete foreign engines and airframes

[53] 2085-663, "General Summary Japanese Air Service," 3.
[54] Ibid., 5.
[55] Ibid., 7.

was constantly noted, as was the lack of training for pilots. A few reports attributed these deficiencies to the national characteristics of the Japanese people. One assessment stated that, "the Japanese is not a natural flyer and rarely loves flying for its own sake. Neither is he a natural mechanic, nor has he any tradition of trained mechanics behind him."[56] While it is easy to dismiss this statement as racist or irrational, it did contain some truth. The Japanese air services had a chronic shortage of trained mechanics, partly because Japan was not a fully industrialised nation like the United States or Great Britain. The Japanese economy, despite massive leaps since the Meiji Restoration, continued to operate "with one foot in the nineteenth century."[57] Once again, the quality of Japanese pilots was called into question, but the report concluded that if American pilots were considered "very good," the Japanese were rated "good."[58] This statement made it clear that the Japanese were inferior to their western counterparts, but it was hardly irrational or unfair. The assessment accurately pointed out the weaknesses within the Japanese air services.

American assessments continued to focus on the quality of Japanese pilots and mechanics. One report on formation fighting commented that Japanese were able to hold the correct formation, but if anything unusual occurred, it was "thrown into confusion" and disintegrated. The author attributed this to a lack of initiative on the part of the Japanese pilots.[59] A major report on Japanese aviation, written by Major W.B. Duty in 1928 after a tour of numerous air stations and aviation factories, extensively addressed all aspects of air power. He

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[56] 2085-748, "Japanese Aviation: Army, Navy, Civil," July 20 1927, *US Military Intelligence Reports, Japan, 1918-1941*, Reel 29, University Press of America, 2.
[57] Bergerud, *Fire in the Sky*, 17.
[58] 2085-748, "Japanese Aviation: Army, Navy, Civil," 2.
[59] 2085-772, "Training of Aviation Combat Regiments in Formation Fighting," April 28 1928, *US Military Intelligence Reports, Japan, 1918-1941*, Reel 29, University Press of America.

viewed mechanics within the Japanese air services as poor, though civilians brought in to help the military were good.[60] Japanese engine designers were not studying how to create original designs, but instead to improve foreign designs that Japan had acquired.[61] The underdeveloped state of Japanese civilian aviation prevented Japan from building any significant reserve of pilots.[62] Duty's striking observation noted one of the largest hurdles Japan must overcome in order to become a true first-rate air power. If Japan could not build up a reserve of trained pilots, the attrition resulting from a war against a major air power would quickly exhaust its air arms. This problem ultimately destroyed Japanese air power during the Pacific War.

Taken as a whole, the American intelligence assessments of Japanese air power during the 1920s were highly accurate from the strategic and industrial spheres down to the tactical and technological level. The reports focused on broader issues such as the availability of raw materials in addition to the quality of pilots and aircraft, and discussions of lower level issues were placed into strategic context. Lax information security measures within Japan allowed American observers, both civilian and military, a remarkable level of freedom. Conversations with Japanese officers, designers and workmen, and open tours of factories and airfields, provided large amounts of information. The numbers and types of available aircraft, layouts of air stations, details of factories and the smallest technological advances made in the field of aviation were all easily accessible.

Japanese industry and technical innovation were the two areas that received the most scathing assessments. The chronic copying of foreign technology and techniques meant that the

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[60] 2085-784, "Report of Major W. B. Duty," September 20 1928, *US Military Intelligence Reports, Japan, 1918-1941*, Reel 29, University Press of America, 83.
[61] Ibid., 88.
[62] Ibid., 85.

Japanese always literally followed in lockstep behind the western powers in military aviation throughout the 1920s. This let the Americans accurately track the aircraft in use by the Japanese at any point, along with their detailed performance characteristics. The Americans carefully noted the inefficiency of Japanese industry and its reliance on imports of raw materials, machine tools and foreign advisors as major obstacles to Japan's wish to become a major air power. These harsh assessments were correct at the time. Those problems, with the exception of a need for foreign assistance, continued right into the Pacific War. Japan's reliance on copying of foreign technology would end years before the war began, but the preconceived notion of Japanese unoriginality that began as an *accurate assessment* in the 1920s survived within the American intelligence community through to 1941, despite increasing evidence to the contrary. However, the problems caused by the firm belief in Japanese unoriginality cannot be blamed on reporting during this earlier period.

Assessments of Japanese aviation personnel were negative, but remained fair and almost entirely devoid of racial bias. The overall impression set during the period was that Japanese pilots and ground crew were noticeably inferior to their western counterparts, a view which was justified due to Japan's lack of experience in the First World War and the relative youth of the Japanese air services. Pilots lacked the flight hours and realism of training which western observers deemed necessary to produce high quality personnel. Most importantly in the view of the Americans, the Japanese lacked any meaningful reserves of pilots, mechanics and other ground crew. This issue, combined with Japan's industrial and technological weakness, meant observers at the time accurately believed that Japan had yet to develop the capability to win a large-scale air war against a major western power. No mirror imaging of industrial, technical, tactical or personnel factors were present in the assessments. Despite these weaknesses, the

Americans also said that the Japanese could significantly and quickly improve their air services if they so desired.

CHAPTER 3: AMERICAN INTELLIGENCE ASSESSMENTS OF JAPANESE AIR POWER, 1930-1937

The early and mid 1930s brought with them a fundamental change in the trajectory of the Japanese air services. Their dependence on foreign technology and assistance began to decrease. At the same time American intelligence assessments, which had been excellent at all levels during the 1920s, began to drop noticeably in overall quality. This decline stemmed partly from the dramatic improvement of Japanese information security, which closed off many of the avenues for intelligence gathering upon which the Americans had relied throughout the 1920s, and the increasing influence of preconceived notions of Japanese unoriginality. Observations concerning the Japanese aviation industry and the broad strategic value of air power remained consistent and accurate. However, American knowledge of Japanese advances in technology and tactics progressively changed from being realistic assessments made through direct observation, to preconceived notions of Japan's inability to innovate, without extensive foreign assistance, based on no evidence at all. Opinions of Japanese personnel became increasingly contradictory. As it was difficult to form an accurate picture of their relative quality, the motif of Japanese unoriginality began to permeate this area of analysis as well. Ethnocentrism remained in the reports, but it continued to reveal itself only through the tone and language used by the authors, as opposed to being the driving force behind their conclusions. As had been the case in the preceding decade, racism and mirror imaging did not significantly affect American conclusions.

The assessments which came out of Japan from 1930 to mid 1937 continued to accurately track the rapid expansion of the air services, along with the problems that constantly plagued the Japanese aviation industry. One such report, received on June 8, 1930, contained comprehensive details concerning Japanese aircraft production across the dozens of factories that had sprung up

in the country. For example, the Kawasaki Dockyard Company in Kobe possessed approximately 200 machine tools in its aircraft and engine factory, almost all of American manufacture.[63] Once again, the observers identified underlying weaknesses in the Japanese aviation industry, even as its proficiency increased. The Japanese had relied heavily on the importation of foreign machine tools during the 1920s, and did so even more as the industry expanded. Despite the continuing weakness of the Japanese aviation industry, the author of another report was surprised at the "remarkable strides" which the Japanese army and navy had taken during the previous year, both in quality and quantity of production.[64] These strides were driven by strategy. The Japanese navy wished to use air power to overcome the disadvantage in the surface fleet institutionalised by the Washington and London naval arms limitation treaties. In particular, these treaties kept Japanese strength in capital ships around 60% of British and American levels. Through the 1920s, the IJN looked to light fleet units to make up for its shortage of capital ships, but the London Naval Treaty in 1930 effectively neutered this alternative by extending the 5-5-3 ratio to such vessels. This led the IJN to turn wholeheartedly to the development of naval air power.[65] 16 new air groups were requested to make up for reductions of surface forces under the treaty, and another 16 to match the expansion of US naval air power. The Diet approved 14 new air groups under the first replenishment program of 1931 and an additional 8 under the next program of 1934.[66]

Foreign observers closely followed Japan's increased efforts to expand the air services. In

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[63] 2085-680, "Aircraft Factories," June 8 1930, *US Military Intelligence Reports, Japan, 1918-1941*, Reel 28, University Press of America, 4.
[64] 2085-844, "Aircraft Building of the Army & Navy during 1931," March 6 1932, *US Military Intelligence Reports, Japan, 1918-1941*, Reel 29, University Press of America, 1.
[65] Peattie, *Sunburst*, 27; for further details on the London Naval Conference, see John H. Maurer and Christopher M. Bell, ed., *At the Crossroads between Peace and War: The London Naval Conference of 1930* (Annapolis: Naval Institute Press, 2014).
[66] Yoichi Hirama, "Japanese Naval Preparations for World War II," *Naval War College Review* 44:2 (1991): 69.

1934 the Soviet State Military Publishing Bureau published a book on the Japanese air services written by D. Streshnevsky. It noted that in 1930 "events of an international nature" changed the original trajectory of the Japanese air services. Funding was dramatically increased and the Diet approved significant acceleration in the construction of new air stations. The number of airfields in Manchuria and Korea exploded. In the province of Kirin, alone, 14 new airfields were constructed in 1933.[67] In 1934, the IJNAS received a budget of 65 million yen. The speed of expansion was such that new air stations were not being completed fast enough to keep pace with the formation of new aviation units.[68]

Streshnevsky's views on the quality of Japanese industry roughly coincided with those of the American intelligence services, however he was far more appreciative of Japanese advances and successes. During 1932 and 1933, the Japanese aviation industry expanded considerably. Old factories were enlarged and modernised while new ones were opened. The annual production of aircraft had increased at least three times and Japan had 550 "basic naval aviation [land-based aircraft]."[69] This claim likely was an overstatement as at the end of 1937, three years after Streshnevsky's book was published, the IJNAS possessed only 562 land-based aircraft.[70] The book listed all the aviation-related factories in Japan and noted that almost every single one had been enlarged, reconstructed or both.[71] Despite these strides, the Japanese aviation industry still depended on foreign imports. Japan's access to raw materials was improving due to its recent conquest of Manchuria along with better exploitation of the Home Island's own resources,

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[67] A-1-a 21973, "Development of the Japanese Air Fleet," March 5 1936, *Naval Attaché Reports, 1886-1939*, Box 10, RG 38, NA, 15.
[68] A-1-a 21973, "Japanese Naval Aviation," June 1 1936, *Naval Attaché Reports, 1886-1939*, Box 10, RG 38, NA, 1.
[69] A-1-a 21973, "Development of the Japanese Air Fleet," 2.
[70] Peattie, *Sunburst*, 29.
[71] A-1-a 21973, "Development of the Japanese Air Fleet," 7-12.

but still inadequate for the aviation industry. Fuel was the most critical shortage, due to Japan's complete lack of indigenous sources, but the Japanese were aware of their weakness in raw materials and were making great efforts to create large stockpiles.[72] Such discussions of strategic resources were a staple of intelligence assessments of Japanese aviation in the 1930s, justifiably. Regardless of how much the Japanese aviation industry expanded, it could not function if it lacked the materials needed to construct and operate aircraft. Public debates within the Japanese Diet outlined the budget appropriations for the air services, which gave foreigners limited knowledge of the expansion of Japanese military aviation, in a broad, fiscal sense.

Increasingly, western observers were forced to rely on open sources, such as debates within the Diet, in place of the informative avenues that they had used previously. The Japanese press also reported generally on the air services. For example, American observers used the media to track discussions about the possibility of combining the IJAAS and IJNAS into a unified air service.[73] The press and debates within the Diet illuminated broad issues such as Japanese aviation's strategic and industrial weaknesses, but not Japanese progress in tactics and technology. Alternate sources, such as interviewing foreign aviation experts, inspecting air stations and factories, and receiving information directly from the Japanese military all began to decrease in frequency and quality during this period before disappearing almost entirely with the start of the war in China.

A report from February 1930 revealed optimism regarding Japanese openness, when it stated that details regarding the development of new Japanese aerial torpedoes would be obtained

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[72] Ibid., 6-7.
[73] E-8-a 21984, "Japanese Army desires for Unification of Army-Navy Air Service Opposed by Navy," March 20, 1936, *Naval Attaché Reports, 1886-1939*, Box 732, RG 38, NA.

during a future aviation inspection.[74] Such details never surfaced. It quickly was realised that the Navy Ministry was unwilling any further to provide detailed information. The Americans still were able to gather much intelligence regarding strategic and industrial issues through facility inspections and interviews with western experts who visited Japan, but nothing provided the kind of detailed tactical and technical information that they had grown accustomed to having in the 1920s. While the Americans had used open sources throughout the previous decade, these were not the primary source of new information. Throughout the 1930s, the frequency of reports which simply paraphrased stories in the Japanese and western press gradually increased and replaced the detailed assessments derived from other sources. Thus, the quality of assessments concerning tactical and technical issues began to slide between 1930 and 1937, while evaluations of strategic and industrial issues remained consistently excellent.

The Americans success in keeping up with Japanese industrial advances throughout the period rested in part through interviews with western aviation representatives who regularly visited Japan at the request of both the government and private industry. One such visitor was Philip G. Lucas, a test pilot for the British Hawker Company. Lucas spent two and a half months in Japan in 1935 to showcase two Hawker Nimrods, the carrier version of the Hawker Fury. He spent most of his time at Kasumigaura Naval Air Station, but entered the main Nakajima aircraft plant during his stay. He rated the factory, and the Japanese generally, as "excellent industrially."[75] Mr. Burgoine of the Bristol Company came to the same conclusion. The Japanese had excellent manufacturing techniques and were fully capable of "any class of technical

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[74] A-1-j 18215, "Aerial Torpedoes," February 24 1930, *Naval Attaché Reports, 1886-1939*, Box 51, RG 38, NA.
[75] A-1-a 21684, "British Estimate of Japanese Aviation, Continued," May 1 1935, *Naval Attaché Reports, 1886-1939*, Box 10, RG 38, NA, 1.

accomplishment," but in order to achieve this status, they had to be properly taught.[76] The implication was that western experts were needed to do the teaching, otherwise any bad habits learned by the Japanese aviation industry would continue without detection. Other assessments were more critical. Victor Bertrandias, a representative from the Douglas Company, dismissed the industrial efficiency of the Kawanishi plant as far below that of American aircraft manufacturers. The naval attaché in Tokyo fully concurred with Bertrandias' sentiment, though neither elaborated on *how* it was less efficient.[77]

These more negative assessments were not limited to civilian experts. On February 10, 1937 the Americans received a full copy of the report from a British RAF officer who had been attached to the Japanese 4th Air Regiment. One of the main conclusions the Americans drew from the report was that Japan lacked a true aircraft reserve which could be used to replace losses. "Planes designated as 'reserve planes' are used as much as those in service and the number may vary from none at all to a disproportionate percentage, especially where units are being equipped with new models."[78] The Americans and British saw the lack of depth in aircraft reserves as a "fatal flaw," since they rightly measured an air power in terms of its ability to take sustained losses rather than just tactical ability and technological sophistication.[79]

In June 1937, the American military attaché noted that Mitsubishi's Nagoya Aircraft Works had added more than 2,000 employees since the previous year. "This factory has expanded and is continuing to expand and modernize...Large scale production can now be

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[76] A-1-a 21684, "British Estimate of Japanese Aviation," February 11 1935, *Naval Attaché Reports, 1886-1939*, Box 10, RG 38, NA, 3.
[77] A-1-a 21684, "Visit to Japan of Mr. Victor E. Bertrandias of the Douglas Aircraft Company," February 16 1937, *Naval Attaché Reports, 1886-1939*, Box 10, RG 38, NA, 2.
[78] 2085-810, "Military Aviation - General: Attachment of British Officer to the 4th Air Regt.," February 10 1937, *US Military Intelligence Reports, Japan, 1918-1941*, Reel 29, University Press of America, 1.
[79] Kennedy, "Anglo-American Strategic Relations and Intelligence Assessments of Japanese Air Power," 755.

accomplished, and shop practice and workmanship compares very favorably with such activities in the U.S. The plant is now a vital part of the Japanese aircraft industry, and would be of inestimable value in case of war."[80] Another report concluded that while the Japanese were adept at copying foreign designs, the method of production lagged far behind the west, which led to greatly inflated costs.[81] Overall, reports stressed that Japanese industrial practices were rapidly improving, but still struggled with many inherent weaknesses, such as a reliance on foreign techniques and a shortage of skilled labour, raw resources and machine tools.

Appraisals of Japanese technological progress began to slip in quality during the early and mid 1930s. The preconceived notion that the Japanese were incapable of technical innovation in aviation, which had been true during the 1920s, began to mask the Japanese progress in the area from the early 1930s. It is telling that the translation of Streshnevsky's work was the only report from the naval attaché's office in Tokyo that emphasised Japan's growing inventive capabilities. Streshnevsky, a Soviet analyst, wrote from the perspective of a state far less self-confident in air power, and more afraid of Japan, than Britain or the United States – indeed, from one in a position close to that of Japan itself. Streshnevsky stated that Japanese naval aviation was still behind the west, but the IJN was working feverishly to rectify the situation. Despite these efforts, only the fleet's scouting aircraft were modern and not its fighters and bombers. The IJAAS lagged further behind, but was increasing in capability as it moved to the top of the army's priority list.[82]

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[80] 2085-812, "Aircraft Production - Non-Governmental. Mitsubishi Heavy Industries Company, Ltd. Nagoya Aircraft Works," June 7 1937, *US Military Intelligence Reports, Japan, 1918-1941*, Reel 29, University Press of America, 3.
[81] 2085-885, "Air Information," April 28 1934, *US Military Intelligence Reports, Japan, 1918-1941*, Reel 29, University Press of America, 1.
[82] A-1-a 21973, "Japanese Naval Aviation," 5.

These advances stemmed largely from the adaption of foreign technique and technology, but Streshnevsky saw that the days of wholesale copying of western designs was in rapid decline.[83] Beginning in 1928, the Japanese air services began gradually to replace foreign designed aircraft with indigenous equivalents. One of the first indigenous designs accepted for service was a simple reconnaissance plane. In Streshnevsky's view, the reequipping of air units with aircraft of native construction was "going on in full swing" by the early 1930s and the technical and tactical qualities of light bombers and scouting aircraft were "not inferior" to European nations. This claim was backed up with extensive charts detailing the exponential increase in the performance characteristics of recent Japanese aircraft.[84]

Streshnevsky's assessment, while excellent in many respects, overstated the technological strides the Japanese made from 1928-1934. He contradicted himself by claiming that the Japanese air services were underdeveloped, but at the same time had aircraft which were roughly equivalent to European nations. In reality, Japanese technological progress during the early 1930s was not yet equal to the west. For example, the D1A ('Susie') dive bomber developed for the IJNAS in 1934 actually was a licensed copy of the German He-66. Japanese engineers modified the original design so it could fly from aircraft carriers, but the plane remained fundamentally German, not Japanese.[85] Streshnevsky conceded that full-blown originality was still rare within the Japanese aviation industry. Japan continued to buy small numbers of foreign aircraft and engines so that they could be studied and copied. However, his key observation was that Japan had ceased the mass importation of aircraft since 1931 and

[83] Ibid., 1; A-1-a 21973, "Development of the Japanese Air Fleet," 1-2.
[84] A-1-a 21973, "Development of the Japanese Air Fleet," 2-5.
[85] Francillon, *Japanese Aircraft of the Pacific War*, 268.

engines in late 1932.[86] He correctly saw this change as a sign that the Japanese aviation industry was weaning itself off of its dependence on foreign technology. The aircraft developed between 1930 and 1934 would be the last which fundamentally relied on foreign assistance. In 1934, Streshnevsky was the only western observer to understand this key development in Japanese air power.

Western observers and American intelligence clung to the idea that the Japanese were incapable of innovating, though their assessments were more reserved and balanced than those which followed in the late 1930s. In 1934, one report concluded that the IJNAS still heavily depended on foreign designs for aircraft armament.[87] From his visit to the Nakajima plant in 1935, Lucas of Hawker Company concluded that the Japanese still were copying and combining designs of foreign origin.[88] Mr. Parker of Bristol Company described the Japanese as "notorious copyists" incapable of producing anything original. Despite the harsh tone, his explanation for why this was the case was reasonable, though increasingly obsolete. The Japanese personnel at the top of firms were unwilling to trust designers lower down, and preferred to stick with what worked: copying foreign designs. In turn these practices caused a lack of initiative and originality among the lower level engineering personnel.[89] This situation may have been true through the 1920s and early 1930s, but was vanishing at the time of Parker's statement. Similarly, and incorrectly, Burgoine stressed that Japanese aircraft were derived "in their entirety" from foreign designs.[90]

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[86] A-1-a 21973, "Development of the Japanese Air Fleet," 6.
[87] A-1-m 15776, "Japanese Naval Aviation – Armament," February 8 1934, *Naval Attaché Reports, 1886-1939*, Box 68, RG 38, NA.
[88] A-1-a 21684, "British Estimate of Japanese Aviation, Continued," 2.
[89] A-1-a 21684, "British Estimate of Japanese Aviation," 4.
[90] Ibid., 6.

Instead, by 1932 the Japanese were modifying foreign designs to fit their own needs rather than simply copying them wholesale. An increasing number of designs were entirely of Japanese origin. The IJNAS and IJAAS both moved from their dependence on foreign assistance in aircraft design at the same time. The IJA's Ki-10 ('Perry') biplane fighter entered production in late 1935. While not a revolutionary aircraft by any standard, it was one of the finest fighters of its day and would be the last combat biplane design to enter service with the army. [91] The Ki-10 was a strong first step into the realm of independent aircraft design and manufacturing by the IJAAS. In addition to this frontline fighter aircraft, many ambitious design requirements were defined from which prototypes were developed from 1934-1937, as was true of the world's leading air powers. The Ki-21 ('Sally'/'Gwen') medium bomber, Ki-32 ('Mary') light bomber, Ki-30 ('Ann') light bomber, Ki-15 ('Babs') reconnaissance aircraft and Ki-27 ('Nate') fighter all had their beginnings in this period, and combined to bring the IJAAS toward rough technological parity with western air powers in the late 1930s.[92] The IJNAS moved ahead of its army counterpart with the superlative G3M Rikko ('Nell') medium bomber and the A5M ('Claude') carrier fighter. The G3M was the finest bomber in service with any air power at the time. The A5M was the best carrier borne fighter in the world, while remaining competitive with other land-based designs of the period.[93] The aircraft were conceived through the government's "prototypes system," which was broadly similar to British practices and perhaps adopted from them. Japanese manufacturing firms developed aircraft according to specifications defined by the IJAAS and IJNAS. These prototypes then would compete against each other for the final bid.

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[91] Francillon, *Japanese Aircraft of the Pacific War*, 86; Hagiwara Mitsuru, "The Japanese Air Campaigns in China, 1937-1945," in *The Battle for China: Essays on the Military History of the Sino-Japanese War of 1937-1945*, ed. Mark Peattie, Edward Drea and Hans Van de Ven (Stanford: Stanford University Press, 2011), 240.
[92] See Francillon, *Japanese Aircraft of the Pacific War*.
[93] Peattie, *Sunburst*, 86, 89; see Francillon, *Japanese Aircraft of the Pacific War*.

The losing firm would become a second-source supplier, producing the other's design under license, so learning its techniques.[94] By the outbreak of the Second Sino-Japanese War in July 1937, the Japanese had achieved independence in the field of aviation design and manufacturing, something that went unnoticed by American observers.

American assessments of the quality of Japanese pilots, mechanics and workmen were increasingly varied and contradictory. Generally, Japanese personnel were viewed as competent in most areas, but still struggling with basic problems. Information on the quality of Japanese pilots was gleamed through direct observation and second-hand conversations. In one such conversation, a Japanese officer expressed shock that his American counterpart had been commended for making a carrier landing at night. The American officer inferred that night landings were not unusual within the IJNAS, and observed that the Japanese officer did not seem to know that the American commendation was for a landing made almost a decade earlier.[95] Mr. R. Moffett of Wright Aeronautical Corporation dismissed Japanese naval pilots as "very poor" at handling modern aircraft engines, illustrating his point with a series of technical examples.[96] Bertrandias highlighted the same deficiency in the handling of engines and large aircraft by commercial pilots, and concluded that the Japanese "in general, [did] not have a high degree of intelligence" where aviation was concerned.[97] His comment concerning Japanese intelligence verged on ethnocentrism and preconceived notions of the Japanese people. However, this conclusion stemmed from his observations *as interpreted through the lens* of ethnocentrism,

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[94] Hagiwara, "The Japanese Air Campaigns in China," 239.
[95] A-1-a 19378, "Japanese Naval Aviation – Night Flying Equipment," January 10 1934, *Naval Attaché Reports, 1886-1939*, Box 5, RG 38, NA.
[96] A-1-a 21684, "Visit to Japan of American Aircraft Representative," September 18 1935, *Naval Attaché Reports, 1886-1939*, Box 10, RG 38, NA, 1.
[97] A-1-a 21684, "Visit to Japan of Mr. Victor E. Bertrandias," 2.

rather than being formed by the latter alone. Moffett and Bertrandias' harsh views were on the more critical end of the spectrum, but the consistency of their statements indicates that their observations about the specific issue of engine handling likely were correct.

Lucas from Hawker Company, stated that the Japanese were "competent" pilots who should not be underrated, implying that the common views held in the United States and Great Britain were inaccurate.[98] Parker and Burgoine both agreed that the Japanese were "excellent" fliers with one weakness, the lack of initiative and originality in their flights.[99] This kind of observation from industry veterans is perplexing, as what exactly constituted "initiative and originality" in military flying was never adequately explained, or supported with specific observations. Perhaps Parker and Burgoine did not feel comfortable simply stating that the Japanese were capable airmen, and decided to add a reference to the prevailing views of Japanese unoriginality. Two foreign air force pilots, one British and one German, were given increasingly rare opportunities to witness Japanese pilots in flight while they toured Japanese army and naval air stations in early 1935. The German officer stated that the Japanese were "good" pilots. His British counterpart held the same opinion, with the qualification that the Japanese tended to be more "conservative" in their manoeuvring.[100] Again, a positive assessment was qualified with a reference to conservative flying, without initiative or originality. Streshnevsky's analysis of Japanese air performance over Shanghai in 1932 left a poor impression of the Japanese, though he tried to emphasise positive points. Japanese bombing was

[98] A-1-a 21684, "British Estimate of Japanese Aviation, Continued," 2.
[99] A-1-a 21684, "British Estimate of Japanese Aviation," 4.
[100] A-1-a 21684, "Foreign Opinions Regarding Japanese Naval and Military Aviation," February 21 1935, *Naval Attaché Reports, 1886-1939*, Box 10, RG 38, NA.

ineffectual because of poorly trained pilots and insufficient bomb loads.[101] The fact that this assessment of Japanese capabilities, two years old in March 1936 and discussing an event which had occurred four years earlier, was still presented by the naval attaché's office in Tokyo as fresh news, indicated a growing difficulty in obtaining new information regarding Japanese pilots.

Americans assessed Japanese mechanics and workmen much as they did their flying compatriots. Thus, Moffett originally was sent to Japan in 1935 at the request of the Mitsui Company to troubleshoot a problem with an American-designed engine that the IJN had purchased the previous year. He quickly discovered the source of the problem and gave the Japanese a list of recommendations regarding how to fix it. Unexpectedly, the Japanese Navy Ministry requested Moffett to teach a selected group of officers from the navy and engineers from Nakajima about the maintenance and operation of aircraft engines in general. The instruction involved everything from tear-down and reassembly, starting and stopping, explanation of the functioning of individual parts and answering general questions. The naval attaché noted that this instruction appeared to be the "real purpose" behind the request for this visit. Moffett condemned all the Japanese engineers, mechanics and workmen with whom he worked. Engine mechanics, "lamentably poor" when tasked with correcting minor difficulties with auxiliary equipment, had to be shown the exact detailed procedure to follow. Enlisted men appeared "stupid." Moffett concluded that the Japanese "are striving far beyond their capabilities in the engine field." [102]

The naval attaché, apparently surprised by such harsh criticism, explained that Moffett's

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[101] A-1-m 15776, "Fighting Experience of the Japanese Military Air Forces," March 17 1936, *Naval Attaché Reports, 1886-1939*, Box 68, RG 38, NA, 6.
[102] A-1-a 21684, "Visit to Japan of American Aircraft Representative," 1.

interpreter had difficulty with technical explanations, which may have caused both sides to dislike each other. Therefore, "these barriers, perhaps not fully appreciated by Mr. Moffett, may have tended to color his observations somewhat."[103] Moffett's assessment of the quality of Japanese mechanics, engineers and workmen was the best informed and also the most critical of any account during this period. The naval attaché's decision to downgrade Moffett's report, and to explain that it stemmed from the language barrier was dubious but, more importantly, indicated that he was capable of critical thought when it came to assessing Japanese capabilities. While ethnocentrism shaped many reports, negative statements that fit American stereotypes of the Japanese were qualified and placed into context by the naval attaché before being passed on to his superiors.

Other western aviation representatives had kinder words for Japanese personnel. Lucas described the Japanese mechanics whom he met as "extremely intelligent" and rated the overall quality of IJNAS maintenance personnel as "very high." He felt as if he had been staying on a RAF station rather than a Japanese one, while personnel carried on the "indoctrine (sic)" provided by the Sempill Mission. Japanese officers and enlisted men were proud of the "British standards" they maintained and "even improved in some respects."[104] Interestingly, this positive evaluation was coined in ethnocentric terms, where "British" was synonymous with "efficiency and excellence," and Japanese achievements to attain that level of efficiency were indirectly reduced to the same tropes of copying. Burgoine and Parker offered a similar, though more nuanced, view. Both believed that the Japanese could learn rapidly through experience, and thought the mechanics in the aviation industry well-trained and "excellent," but lacking

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[103] Ibid., 1.
[104] A-1-a 21684, "British Estimate of Japanese Aviation, Continued," 1-2.

experience with machine tools.[105] Burgoine and Parker's assessment of personnel was the most balanced from the western aviation representatives that went to Japan. It complimented the Japanese on their abilities, but also noted areas in need of improvement.

Increased Japanese information security contributed to American difficulties in following advances in technology and tactics. One enlightening case was the gradual decline in the quality of American inspections of Japanese air stations. These inspections occurring with regularity, in some cases more than once a year, once were an important source of information on the quality of Japanese aircraft, aerial tactics and personnel. The first tour of Tateyama Naval Air Station occurred in December 1930, only four months after it was opened. The Japanese officer who led the inspection spoke openly about details of the station and even expressed his low opinion of the enlisted men on site.[106] The Americans were allowed to enter the machine shop, which was only partially equipped.[107] The next inspection occurred in January 1932, reflecting a shift in access. Many of the air station's buildings still were entered, but the descriptions were noticeably less detailed than the previous report. The naval attaché wrote that "the desire seemed to be to make our visit as pleasant as possible without divulging any pertinent information." Their escort spoke English, but would only make small talk about issues other than the military or aviation.[108] The 1933 inspection revealed the first sign of American frustration about the increasing secrecy of the Japanese. The report, substantially shorter than the first two, was largely filled with

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[105] A-1-a 21684, "British Estimate of Japanese Aviation," 4.
[106] Haruko Taya Cook and Theodore F. Cook, *Japan at War: An Oral History* (New York: The New Press, 1992), 139. The Japanese air services were unique in that most of their combat pilots were enlisted men. As a result, tension between enlisted men and officers was widespread. Enlisted men viewed officers as arrogant and ignorant while officers viewed the enlisted men as uneducated and simple-minded. The IJNAS ace Sakai Saburō, an enlisted man, emphasised that these attitudes undermined unit cohesion in and out of combat.
[107] A-1-l 19973, "Tateyama Naval Air Station," December 4 1930, *Naval Attaché Reports, 1886-1939*, Box 64, RG 38, NA, 2-3.
[108] A-1-l 19973, "Tateyama Naval Air Station," January 30 1932, *Naval Attaché Reports, 1886-1939*, Box 64, RG 38, NA, 3.

complaints concerning lack of access to the facilities on site. It noted that "one hangar" had been entered. The phrase was underlined, with extra emphasis scribbled around "one," as if the reader was frustrated that American observers had been denied access to the remainder of the air station.[109]

Despite the increasing security, the Americans were not completely denied access. In 1935 the inspection was considerably more detailed than during 1933, but less informative than those of 1930 and 1932. The most interesting piece of information gleaned in 1935 was the noticeable enlargement of a number of hangars on site. When one American officer asked their Japanese minder about this development, surprisingly he replied that the air station was preparing to receive "much larger bombers" of a new type. The naval attaché wrote that the inspection had been "very good," with access granted to "all reasonable areas and with fairly free discussion."[110]

From 1930-1935, Japanese security was tightening, but varied by location and the officer in charge of escorting observers. Any optimism that may have been generated from the inspection of 1935 was quickly crushed. The 1936 report was vague and generic. It concluded that "Tateyama Naval Air Station is a modern and well-equipped establishment," but few details of any consequence were noted other than that older air stations, such as Tateyama, were not receiving new equipment quickly, due to the priority of equipping new aviation units. The American observers were escorted by two Japanese officers who had been at the station for less than a month. Neither spoke any English, both professed an almost complete lack of knowledge

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[109] A-1-l 19973, "Tateyama Naval Air Station," December 4 1933, *Naval Attaché Reports, 1886-1939*, Box 64, RG 38, NA, 1.
[110] A-1-l 19973, "Tateyama Naval Air Station," December 31 1935, *Naval Attaché Reports, 1886-1939*, Box 64, RG 38, NA, 1-2. The new type of bomber noted in the report was the G3M which would enter service in the coming months.

of local affairs or aviation. The naval attaché believed the obvious intention was to prevent the American visitors from obtaining any meaningful information. The tour of the air station was rushed, with their Japanese guides claiming that they should move through in about 20 minutes. The Americans managed to stretch this time to four hours, of which about one hour was used for inspecting.[111] This example was typical of reporting and inspections during the mid 1930s.

Three brief reports from the Saeki Naval Air Station opened in March 1935 followed this trend. The first inspection, in June 1935, detailed nothing of importance. It concluded the inspection was "most unsatisfactory" and that a "general feeling of unwillingness, evasion, and haste" made the gathering of information impossible.[112] The 1936 inspection followed in the same vein and concluded with a vague statement about the modernity of the facilities that was nearly identical word-for-word to that of the 1936 report on Tateyama Naval Air Station.[113] Due to a lack of meaningful information to relay to the United States, the naval attaché began writing reports to a kind of template which allowed them to remain a similar length, but lacked the content provided before 1936. The following year's report was a full page and a half shorter than that of 1936. It noted that air station personnel refused to discuss "pertinent subjects" and only a few hangars and other buildings actually were visited. This complaint again was underlined by the reader as an explanation for why the report itself was so underwhelming.[114]

The increasing lack of access to new information concerning the Japanese air services extended beyond the inspection of stations. The increase in Japanese information security

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[111] A-1-l 19973, "Tateyama Naval Air Station," December 24 1936, *Naval Attaché Reports, 1886-1939*, Box 64, RG 38, NA, 1-3.
[112] A-1-l 20825, "Saeki Naval Air Station," June 3 1935, *Naval Attaché Reports, 1886-1939*, Box 65, RG 38, NA, 3.
[113] A-1-l 20825, "Saeki Naval Air Station," April 30 1936, *Naval Attaché Reports, 1886-1939*, Box 65, RG 38, NA, 1.
[114] A-1-l 20825, "Saeki Naval Air Station," May 20 1937, *Naval Attaché Reports, 1886-1939*, Box 65, RG 38, NA, 2.

prevented visiting military officers from gathering as much useful information from any of their typical sources. Captain John Weckerling, the American assistant military attaché in Tokyo, noted that a report from the RAF officer attached to the Japanese 4th Air Regiment in 1937 was the first of its kind since Major Duty's attachment in 1928. Weckerling was disappointed that he could provide little information on training and maintenance, due to new restrictions placed on foreign officers attached to Japanese military units.[115] He was constantly watched by the police, his landlord always reported his movements, and Japanese officers phoned the police whenever he went out with them, so that the authorities would know his location at all times.[116] Ten years before, Duty had far more opportunities for more open observation.

Western aviation experts who were invited to Japan emphasised the dramatic increase in security, and an increasing paranoia concerning foreigners. When he arrived in Japan, Lucas was met on the dock by an interpreter assigned by the Japanese government. The interpreter, who clearly was there to do more than translate, stayed with him the entire time he was in Japan, and even slept in an adjoining room. Although Lucas described the Japanese as "courteous," he felt as if he was being treated as a spy. He had no opportunities to converse with Japanese people except those required for work. Most of his time was spent at Kasumigaura Naval Air Station, but the main purpose of his trip was to demonstrate the Hawker Nimrod. This project necessitated a trip to the Nakajima Plant, but he was forced to wait almost in a state of house arrest on the air base for a week before they let him enter the factory. Lucas believed that this delay was spent shifting sensitive pieces of equipment and personnel around the factory so as to

[115] 2085-810, "Military Aviation - General," 2.
[116] Ibid., 15.

minimise his opportunities for observation.[117]

Burgoine, who had spent a year in Japan in 1927 assisting Nakajima with the development of an engine, returned in 1935 at the request of the Japanese government. He was shocked at the difference in his relations with Nakajima and the Japanese government. Burgoine too was treated "almost like a spy" as the Japanese assumed he was there primarily to detect as much as possible about the advances of the Japanese aviation industry. Individuals who formerly had been close friends of Burgoine and his family were not permitted to visit him for non-work related reasons or, if relevant to his work, were not allowed to spend much time with him.[118]

The most striking case of Japanese paranoia came from the experience of Bertrandias, who stayed in Japan from December 1936 to February 1937. Despite the length of his stay, Bertrandias had little information to provide in his interview. Most of the report detailed the Japanese distrust of his intentions and the tightness of security measures. His visit was intended to conduct and oversee test flights of a Douglas Aircraft Company flying boat delivered to Japan. Most of the test flights Bertrandias observed were conducted at low altitude over short distances. Bertrandias flew the aircraft on the one flight of any distance, from Kobe to Fukuoka, but was not given any maps and did not know the destination until well into the flight. He was given various courses to fly, with the obvious intention of avoiding over-flights of sensitive areas, particularly around the Kure shipyards. Once the aircraft arrived near the Straits of Shimonoseki, Bertrandias was ordered to fly overland, well south of the Straits, toward a cloud-covered mountain range. He refused to do so as he had no knowledge of the mountains, and did not want to risk hitting a peak in the clouds. When his Japanese minders argued with him, Bertrandias

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[117] A-1-a 21684, "British Estimate of Japanese Aviation, Continued," 1.
[118] A-1-a 21684, "British Estimate of Japanese Aviation," 2.

decided to land directly in the Straits with the intention of talking the matter over further and, if necessary, moving through the forbidden zone on the surface rather than the air. This action visibly shook the Japanese on board, who talked about the trouble this approach would cause with the gendarmerie. Their concerns were validated when the flight was redirected to Beppu and the internal security services interrogated the Japanese members of the party. The Americans were not questioned, but the Japanese press later played up the incident, stating that an American representative had deliberately broken the law with possible "ulterior motives." After this incident, Bertrandias was barred from seeing anything of importance.[119]

Despite these increasing restrictions, the overall strategic assessments of Japanese military aviation remained of the highest quality. In 1936, Lieutenant Colonel William C. Crane, the military attaché in Tokyo, provided an excellent summary of American views about the strategic and industrial elements of Japanese aviation. In time of war, Crane believed the weakness of Japanese air power would be in planes and pilots. Japanese aircraft manufacturing, which already struggled with a lack of skilled workmen, would be hindered even more after the outbreak of hostilities due to the need for expanded production while making use of the same limited pool of manpower. Additionally, Japanese industry easily could be deprived of the raw materials needed to manufacture aircraft of quality and quantity.[120] This statement was proven correct toward the end of the Pacific War, when the Japanese aviation industry almost completely collapsed. Chronic problems with engine reliability and landing gear in many late war Japanese aircraft stemmed from extremely poor workmanship and parts, caused by a lack of

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[119] A-1-a 21684, "Visit to Japan of Mr. Victor E. Bertrandias," 1-2.
[120] 2085-687, "Reply to Evaluation of Reports," October 23 1936, *US Military Intelligence Reports, Japan, 1918-1941*, Reel 28, University Press of America, 1.

raw resources and skilled labour, rather than difficulties with the designs themselves. Thus, the J2M interceptor series faced a substantial decline in the production quality of airframes and engines as the war progressed.[121] Crane did not dismiss Japanese power, and agreed that the IJAAS and IJNAS would pose a challenge in the short term. He simply noted that Japan could not win a full-scale and prolonged air war with the United States. Pilot reserves barely met peacetime demands, meaning that Japan's core of trained aircrew would be depleted rapidly through wartime attrition. Thus, the Japanese would shorten their pilot instruction times significantly in order to replace their losses, and send poorly trained and inexperienced aircrew into frontline service with predictable results.[122]

Indeed, shortage of trained aircrew proved to be one of the largest weaknesses of the Japanese air services during the war. By 1939, the IJAAS had trained only 1,700 pilots. Due to the high rate of attrition in China and at the Battle of Nomonhan, the War Ministry planned to churn out that same number every year. However, when the Pacific War started in December of 1941, army flying schools graduated only 750 pilots annually.[123] The IJNAS suffered from the same problem. The navy possessed approximately 3,500 pilots by late 1941, of which only 900 could be considered "outstanding."[124] Thus, neither service had any meaningful pilot reserves. The navy's slow and rigorous pilot training programs produced a small number of graduates who were much better trained individually than their British or American counterparts, but this system also prevented the IJNAS from making up any significant losses sustained through

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[121] *Fighter Combat Comparisons No. 1*, 42.
[122] 2085-687, "Reply to Evaluation of Reports," 2.
[123] Alvin D. Coox, *Nomonhan: Japan against Russia, 1939* (Stanford: Stanford University Press, 1990), 1024.
[124] Peattie, *Sunburst*, 134.

combat.[125] Neither Japanese air service solved this problem. Instead, they sent increasingly inexperienced pilots into frontline units to make up for losses. They were prone to freezing in combat, something which even occurred to Sakai Saburō, a future IJNAS ace, in one of his first sorties against the Chinese. He was saved only by a more experienced Japanese pilot who forced the two Chinese aircraft to break off their attack.[126] A lack of effective pilot and fuel tank protection on almost all versions of the Zero, along with the increasing obsolescence of the design from 1943, meant that any mistake made by a novice IJNAS pilot was often his last.[127] Not only did the Japanese lack experienced pilots, but the inexperienced replacements were being killed before they could acquire a basic level of proficiency.

The nature of most Japanese aircraft armament exacerbated these problems. For example, most Zero variants were armed with two wing mounted 20mm cannons and two cowling mounted 7.7mm machine guns, a common armament configuration for the time, but one which made aerial gunnery more difficult than a uniform armament. Early in the Pacific War, experienced Japanese pilots were able to kill or wound their American counterparts with a well aimed burst of 7.7mm fire into the cockpit.[128] Despite their lethality, only an expert could hit anything with the 20mm cannons, due to their low rate of fire, low muzzle velocity and limited amount of ammunition. All aircraft from the period had only rudimentary reflective gun sights, meaning that hitting targets was like "trying to thread a needle while running."[129] More skill was required to score a fatal hit on an American aircraft with the Zero's armament than an American

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[125] Ibid., 134.
[126] Sakai Saburo, Martin Caidin and Fred Saito, *Samurai!* (Annapolis: Naval Institute Press, 1991), 35.
[127] Peattie, *Sunburst*, 184.
[128] Roger Letourneau and Dennis Letourneau, *Operation KE: The Cactus Air Force and the Japanese Withdrawal from Guadalcanal* (Annapolis: Naval Institute Press, 2012), 14.
[129] Cook and Cook, *Japan at War*, 135.

pilot needed to down a Japanese plane with .50 calibre heavy machine guns, which had a higher rate of fire, muzzle velocity and ammunition count. The "spray and pray" nature of their armament substituted somewhat for marksmanship of American pilots. Green Japanese pilots had no such luxury. Improved aircraft designs with better armament rectified this issue, but they became more difficult to fly. As Japan struggled to keep pace technologically, its pilots were not able to use the aircraft to their full potential. Non-combat losses of modern aircraft also increased exponentially as the quality of Japanese pilots decreased.[130]

Japanese aerial tactics also required well trained pilots. The three-plane shōtai, the basic tactical unit of the Japanese air services, was a highly capable formation if its members were experienced pilots. However, it was easier to break up in combat if experience and training was lacking.[131] This weakness continued up through the Japanese tactical structure, which was prone to decapitation. Once the leader of a formation was killed, the less experienced members often were thrown into disorder, especially because only the leaders of air units knew the tactical details of any mission, leaving junior pilots to slavishly follow orders without real understanding.[132] The assessments of these points of Crane and other American observers were akin to prophecy.

The American intelligence assessments of Japanese air power from 1930 to mid 1937 remained excellent about industrial and strategic issues, but noticeably less accurate regarding technology and tactics. The Americans were critical of Japanese industry and technological innovation. While Japanese aviation firms expanded quickly, many of the problems which

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[130] Peattie, *Sunburst*, 187.
[131] John B. Lundstrom, *The First Team: Pacific Naval Air Combat from Pearl Harbor to Midway* (Annapolis: Naval Institute Press, 2005), 488.
[132] Letourneau and Letourneau, *Operation KE*, 14.

plagued them in the 1920s continued, including a lack of raw resources, machine tools, skilled labour and efficient production methods. So long as these deficiencies remained, the Japanese air services would lack the industrial backbone which American observers correctly deemed necessary to maintain the status level of a first-rate air power.

The preconceived notion of Japanese unoriginality and lack of initiative, particularly in regards to aircraft design, became increasingly influential during the 1930s. The concept had existed throughout the 1920s, when it was true, but the mid 1930s saw the final departure of Japanese aviation from the days of wholesale copying from other nations. The first indigenous Japanese designs, such as the G3M medium bomber, either entered service or had their specifications defined and prototypes built, precisely when American observers clung to the motif of Japanese unoriginality. This assumption would become the main failure in American intelligence assessments of Japanese air power before the Pacific War, but in the early and mid 1930s that argument still had some force. Until 1934, Japan still depended on foreign designs while indigenous aircraft, with a few exceptions, had yet to enter widespread usage. Japan's break from foreign designs would not occur until the late 1930s when all major combat aircraft in both air services were Japanese in origin.

Meanwhile, assessments of Japanese personnel vis-à-vis the western powers became increasingly inconsistent. The opinions concerning the quality of Japanese air and ground crews were diverse, varying wildly from praise to derision and everything in between. Any attempt to make a coherent and singular view would produce a generic answer of little practical use. This situation may have stemmed from continual change and expansion within the Japanese air services, along with a decrease in the opportunity to regularly observe Japanese air and ground crews. Whatever the root causes, the lack of a clear and consistent snapshot of Japanese

personnel became a major problem in the late 1930s. Observers skipped over the muddled reporting of the early 1930s and instead rely increasingly on the negative, and badly outdated, assessments of Japanese personnel from the 1920s.

This drop in the quality of assessment stemmed in part from a dramatic increase in Japanese secrecy. Private Japanese citizens and internal security services closely watched foreigners, the press stirred up xenophobic sentiment, and any actions of foreigners were viewed with great suspicion. The Japanese limited the amount of information available from open sources, and the gradual move from copying foreign ideas meant that American observers could no longer receive large amounts of information from western sources. Japanese military aviation had been an open door for intelligence gathering in the 1920s, but the opening gradually narrowed through the early 1930s, and slammed shut with the start of war in China in 1937. This transition to a tightly-controlled, closed society coincided with the decrease in the quality of reporting on the Japanese air services. These developments caused major failures in assessing technical details. Still, the fundamental American assessments remained accurate. Japan could not win the industrialised and attritional air war the Americans expected to fight.

CHAPTER 4: AMERICAN INTELLIGENCE ASSESSMENTS OF JAPANESE AIR POWER, 1937-1941

By 1937, Japan's air services were independent in the realms of aircraft design, manufacturing, training of personnel and the development of aerial tactics. American intelligence assessments accurately identified the strategic and industrial weaknesses of Japanese air power, but became poor concerning Japanese technology and tactics. Japanese information security was tighter than it had ever been. Hence, American observers formed their conclusions through open sources and preconceived notions. When evidence emerged contradicting the prevailing views of Japan's lack of technological innovation, they were ignored or explained away. As Japan developed the stable of aircraft with which it would fight the Pacific War, the Americans underrated their capabilities. Assessments of Japanese personnel, which had been contradictory and unclear in the early and mid 1930s, began to swing toward a consistently negative view. The experience gained by the IJNAS and IJAAS in China was not ignored, but was thought only to have brought the air services to a level of mediocrity. Ethnocentrism and ideas of national characteristics increasingly emerged in reporting, though they never dominated the assessments. In a break from the earlier reporting, mirror imaging affected specific assessments, typically concerning Japanese aircraft design.

Until the early 1930s, the Americans had relied on access to Japanese aviation bases and factories to gain their information. With the start of the war in China, this avenue was closed. Japanese secrecy was such that in 1942 even the Germans still relied on old photographs of biplanes to illustrate articles which described Japan's victories.[133] In place of the old sources,

[133] Harvey, "Army Air Force and Navy Air Force," 177.

American observers came to rely extensively on the western and Japanese press, official statements, western aviation magazines and books, along with other publically available sources, supplemented with the precious little information that could be drawn from chance sightings of Japanese aircraft by westerners, usually one of the American attachés or assistant attachés. Occasionally, a meaningful assessment of the performance of Japanese air services in China, or detailed technical information of a specific Japanese aircraft would surface, but these were exceptions. The information gained from open sources at best reiterated views which were in place for almost two decades, and at worst became more critical and inaccurate about Japanese capabilities.

The vagueness of the many reports sent to Washington also indicates that the Americans were starved for information. One report from July 1938, barely a paragraph in length, translated a Russian periodical from 1937 which merely stated that the Japanese used dive bombing techniques, with no analysis or insight. That fact been known for years.[134] A regular series of reports paraphrased the IJN's official communiqués concerning operations in China.[135] These summaries were little more than propaganda and the naval attaché added no analysis. Again, an excerpt from a round-table conference of Japanese naval officers on aviation subjects was published in August 1941 for publicity purposes. The naval attaché's office translated the discussion, with some analysis. The Japanese seemed to emphasise the importance of torpedo planes and strongly advocated keeping the IJAAS and IJNAS separate.[136] Neither piece of

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[134] A-1-m 15776, "Dive Bombing in the Japanese Aviation," July 27 1938, *Naval Attaché Reports, 1886-1939*, Box 68, RG 38, NA.
[135] "Japanese Naval Activities in China," July 29 1940, *Naval Attaché Records, 1939-1941*, 1940 File 59-124, RG 38, NA.
[136] "Comments on Naval Aviation by Japanese Naval Aviators," August 23 1941, *Naval Attaché Records, 1939-1941*, 1941 File 62, RG 38, NA.

information was new, and the naval attaché struggled to extract anything meaningful from such sources. The frequency of such superfluous reporting increased dramatically from 1937.

American assessments of the Japanese aviation industry remained accurate, despite Japan's secrecy after the outbreak of the war in China. However, the preconceived notion that Japan could not innovate technologically began to permeate these reports. Before the late 1930s the two subjects had been kept separate, but increasingly the idea of Japan's lack of innovation discouraged any positive conclusions about its industrial capabilities. Thus, a large report of July 1937 noted the further expansion of Japanese aircraft production capabilities. The dramatically increased aviation budgets of the IJA and IJN were seen as "relatively sound" programs, which allowed the expansion of existing facilities along with the opening of new ones, and a "reasonable development" of manufacturing technique. The Japanese still struggled with a lack of skilled labour and machine tools, but the quality and quantity of aircraft production gradually was catching up to that of the United States. This positive, and accurate, assessment was immediately followed by a discussion of Japan's reliance on foreign licenses. The report contradicted itself by claiming that the "relatively sound" expansion program was doomed to fail unless Japan pursued the wholesale acquisition of foreign personnel, material and ideas. A "dearth of local inventive ability" was listed as a major Japanese weakness.[137] The contradiction was clear in the conclusion of the report. One statement that "Japan has reached a point in building technique where it is not so (sic) completely dependent upon foreign aid as in the past," was directly followed by a claim that they still depended on foreign licenses and wholesale copying. Because of a "natural inaptitude" in aviation, Japan would lag behind the "more

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[137] "Expansion of Aircraft Manufacturing Industry," July 21 1937, *Selected Naval Attaché Reports Relating to the World Crisis, 1937-1943*, Roll 2, RG 38, NA, 1.

progressive occidental countries."[138] This pattern continued in almost all American assessments of Japanese industry throughout the period.

Exceptions to this rule occasionally surfaced. An assessment of January 1939 summarised the size of all the aircraft manufacturing companies in Japan and what they produced. A paragraph was dedicated to the industry's dependence on foreign machine tools. The reader highlighted and check marked the comment that a "restriction by foreign countries of exports of aircraft machine tools and their design rights would have a serious effect on the aircraft industry of this country."[139] The report was accurate and never mentioned Japan's inability to innovate. It reflected the tone of earlier reports which kept discussions of Japan's alleged technological weakness separate from their assessments of industrial strength. Most reports did not do so.

American emphasis on Japanese industrial weakness was warranted. Japan's war effort was hindered by a lack of skilled labour and heavy equipment, from the factories to the frontline. The never ending reliability problems which plagued the Ki-61-I, an IJAAS fighter, illustrate these shortcomings. The fighter was powered by a modified version of the German DB 601A inline engine, produced in Japan under license. The engine, which powered the Bf-109E series, was highly reliable in German service, but Japanese industry lacked the skilled labour and precision machine tools needed to ensure that outcome. Additionally, the Japanese mechanics in the field were inadequately trained and equipped to service high performance inline engines, which also required more intricate maintenance to operate properly.[140] Thus, a fighter which

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[138] Ibid., 2.
[139] "Aircraft Manufacturing Industry – Recent Developments," January 26 1939, *Selected Naval Attaché Reports Relating to the World Crisis, 1937-1943*, Roll 2, RG 38, NA.
[140] Bergerud, *Fire in the Sky*, 223.

possessed good performance characteristics for its day posed a larger problem to its own mechanics than American pilots.

The shortage of machine tools, skilled labour and modern industrial techniques also contributed to Japan's lack of an aircraft reserve. In 1938, the Japanese government created a major bureaucratic bottleneck when it ordered that a certain amount of aircraft manufacturing must be awarded to small subcontractors. While leading air powers relied heavily on subcontractors, effective systems were hard to create. The British used subcontractors to prevent overburdening the large aviation firms' management and labour pools.[141] However, in Japan subcontractors became cottage industries, which led to increased production times, a lack of standardisation and a drop in the quality of components.[142] The Japanese government was acutely aware of its skilled labour shortage, particularly after the start of the war in China. It enacted laws in 1938 to boost the number of technicians being trained. The Ministry of Health and Welfare required factories with more than 200 employees to implement compulsory training for their technicians. The technicians were to be classified as "soldiers of industry" and should be "of more than medium standing." However, only larger companies could afford to implement the government program. By 1942, more than 1,500 training facilities were created, but the number of technicians produced was only 30,000 in 1941 and approximately 40,000 in 1942, across *all* industries. The Ministry of Health and Welfare's emphasis on improving the quality and quantity of skilled labour only in large companies created a gap between small subcontractors and the large firms, even though the former produced many key parts. Despite the efforts of the Japanese

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[141] Sebastian Ritchie, *Industry and Air Power: The Expansion of British Aircraft Production, 1935-41* (London: Frank Cass & Co., 1997), 148.
[142] Peattie, *Sunburst*, 100.

government, they were never able to fix the problem. The war effort demanded dramatic increases in aircraft production and the training of new skilled labour was insufficient to meet the demand. The expansion of the aviation industry forced manufacturers to rely increasingly on poorly trained workers, leading to a drop in production efficiency and the quality of the final product.[143]

The western air powers found a way around their own shortages of skilled labour. During the early stages of Britain's expansion of its aviation industry, the drive was for more skilled workers. However, in later years it was found that semi-skilled labour, paired with increased mechanisation of the production process, not only alleviated the skilled labour shortage, but also proved ten to 50 times more efficient than traditional hand work done by skilled labour. Close cooperation with machine tool manufacturers, along with spending more money on jigs, tools and other important fixtures, enabled the British to "de-skill" aircraft production.[144] Due to Japan's shortage of machine tools, most of which were imported from the United States, they were never able to mechanise their own manufacturing industry. Instead, they were forced to continue relying on old and inefficient production methods.

This problem, among others which plagued Japan's industry, meant that only 10,449 Zeros of all models were produced from March 1939 to August 1945.[145] A shortage of aircraft began to emerge almost immediately after war broke out in China. The IJNAS lost 117 aircraft from the middle of September 1937 to the fall of Nanjing in December of the same year.[146] The 1st Combined Air Group lost half of its "medium attack" aircraft in the first three days of the

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[143] Erich Pauer, "Japan's technical mobilization in the Second World War," in *Japan's War Economy*, ed. Erich Pauer (New York: Routledge, 1999), 54-55.
[144] Ritchie, *Industry and Air Power*, 158.
[145] Francillon, *Japanese Aircraft of the Pacific War*, 377.
[146] Hagiwara, "The Japanese Air Campaigns in China," 243.

Battle for Shanghai alone.[147] Before the Battle of Midway, many smaller carriers were stripped of aircraft in order to bring the fleet carriers up to strength. Attack aircraft were in particularly short supply. The light carriers had fewer aircraft than they could carry, and many used planes that were no longer fit for frontline service. Overall, Jonathan Parshall and Anthony Tully described aircraft complements among the Japanese carrier air groups as "downright awful."[148]

The problems which hindered Japanese industry on the factory floor also undermined the air services at the front. A lack of engineers and heavy equipment contributed to the construction of poor taxiways for Japanese airfields, making the movement of aircraft on the ground dangerous and slow. Additionally, the Japanese constructed airfields far more slowly than their American counterparts, which limited their ability to project air power. The Guadalcanal debacle stemmed in part from the slowness of Japanese airfield construction on the island itself and, after its capture by the Americans, Japan's inability to rapidly establish airfields closer to the combat area. This forced the aircraft of the IJNAS to fight at their maximum operational ranges, placing additional strain on man and machine. Both the Japanese and the Allies continuously flew their aircraft beyond the number of flight hours recommended for maintenance overhauls, but the issue was much more prevalent for the Japanese.[149] The performance characteristics of these aircraft degraded significantly if left unchecked. After being wounded in combat Sakai snapped at a reporter asking questions. He complained that Zeros were not getting the maintenance overhauls required to keep them working as they should. This increased the skill required to fly

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[147] Peter Harmsen, *Shanghai 1937: Stalingrad on the Yangtze* (Havertown: Casemate Publishers, 2013), 87.
[148] Jonathan B. Parshall and Anthony P. Tully, *Shattered Sword: The Untold Story of the Battle of Midway* (Washington D.C.: Potomac Books, 2005), 89.
[149] Bergerud, *Fire in the Sky*, 21.

them and made each individual aircraft unpredictable.[150] The Japanese lacked the mechanics and spare parts needed to perform regular overhauls in the field. The IJNAS in particular was crippled by the loss of 721 aircraft mechanics and deck crew, or 40% of the total number embarked, at the Battle of Midway.[151] In 1945, one American ground crewman noted over 1,000 abandoned Japanese aircraft around Clark Field in the Philippines. Most were grounded only due to missing one small part, but the Japanese had made no organised salvage effort and produced too few spare parts to match demand.[152] Colonel Kaneko Inusaka, a member of 4th Air Fleet's supply staff in the South Pacific, stated that the degradation of the combat capability of the IJAAS stemmed mostly from poor maintenance, poor heavy equipment, a shortage of aircraft mechanics, and a dramatic decrease in the quality and quantity of spare parts.[153] Ultimately, the weaknesses of Japanese industry identified by the Americans before the war worked to cripple the offensive capabilities of the IJAAS and IJNAS during it.

Another report of August 1939 made similar predictions, but once again linked an accurate assessment to Japan's lack of technological innovation. The manufacture of aircraft and parts had become the primary concern of the Japanese military and "every effort has been made to place the industry on a sound, permanent basis." Despite these efforts, Japan lacked the raw materials, specifically steel, aluminium and iron, needed to fuel its expansion. This shortage, combined with the rising costs of labour, a lack of machine tools and inefficient government control of materials, formed a "cancer" within the aviation industry. Production was inefficient when compared to American manufacturers, but the quality of their finished products appeared

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[150] Sakai et.al., *Samurai*, 242.
[151] Parshall and Tully, *Shattered Sword*, 417.
[152] Bergerud, *Fire in the Sky*, 23.
[153] Ibid., 46.

"comparable."[154] This assessment seems fair, but was again muddled by the author's preconception that Japan could not create original aircraft designs. Every positive comment concerning Japanese production techniques was followed by a sentence reiterating that this progress was made irrelevant by Japan's inability to innovate technologically. The greatest drawback of Japanese aviation was the "total lack" of adequate design and test facilities. No successful indigenous aircraft were believed to be in military or commercial use. Instead, Japan continued to rely on copies of German, Italian and American aircraft, acquired either through production licenses or "outright mimicry." The government allegedly had provided funds to rectify this situation, but the aviation industry lacked "satisfactory talent" and therefore was forced to continue rehashing foreign technological advances.[155] American assessments combined recognition of the real weaknesses of the Japanese aviation industry, such as a lack of skilled labour, with the fiction that Japan had still relied on the copying of foreign aircraft designs.

Optimistic and, at times, accurate assessments of Japanese technological capabilities did surface on occasion. One report maintained that the Japanese lagged behind Europe and the United States on the "technical-conception" side, and still relied heavily on foreign technology. However, Japan might move away from its reliance on French, English and German technology "in the near future." This assertion was followed by a detailed discussion of Japan's access to raw materials.[156] Despite the inaccurate belief that Japan had not yet moved away from its dependence on foreign technology, the report remained balanced overall. Interestingly, its source was an article in a western aviation magazine.

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[154] "The Aircraft Industry in Japan," August 5 1939, *Naval Attaché Records, 1939-1941*, 1939 File 165-233, RG 38, NA, 1-2.
[155] Ibid., 2.
[156] 2085-680, "From 'Aerophile': Japanese Aviation," November 1937, *US Military Intelligence Reports, Japan, 1918-1941*, Reel 28, University Press of America, 3-5.

A notably accurate report regarding the A5M carrier fighter was sent in 1938. The fighter had been in frontline service since 1937, but its characteristics were not fully known to the Americans until an A5M was shot down over Nanchang in February 1938, and extensively tested by the Chinese Commission on Aeronautical Affairs. The report detailed the capable flight performance of the aircraft, but the American officers were most surprised by the A5M's fundamentally *Japanese* origins. The airframe, engine, metal sheeting and tubing, propeller shafts and instruments were all constructed in Japan. Some parts were built under foreign license, but many were designed by Japanese engineers. The report concluded that "Japan is self-supporting and independent of foreign supplies in building airplanes."[157] It was the only report which connected specific technical characteristics of a machine to the wider implication that Japan could design its own competitive aircraft.

Another assessment sent in June 1939 stated that Japanese aircraft were roughly on par with the machines currently in service in the United States. Japanese designs were considered superior to those being produced in the USSR, and roughly equal to French and Italian models.[158] The report was accurate, but short on details. Throughout the 1920s, American assessments had included extremely accurate information on the flight characteristics of all Japanese aircraft in service, since they were older foreign designs. By the late 1930s, reports became increasingly vague, with terms such as "good" or "roughly equal" slowly replacing any detailed descriptions. Technical information became increasingly difficult to gather after the outbreak of the war in China. For example, the first official photo of the Ki-27 fighter did not

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[157] Leary, "Assessing the Japanese Threat," 274.
[158] 2085-947, "The Capabilities of Japan in Military Aviation," June 23 1939, *US Military Intelligence Reports, Japan, 1918-1941,* Reel 31, University Press of America, 1.

appear in the Japanese press until the aircraft had already been in service for two years.[159] These individual assessments were excellent, but they stood out precisely because the overall impression of Japan's technological advances in the late 1930s was increasingly inaccurate.

Preconceptions of Japanese unoriginality were all-pervasive from the late 1930s. They shaped numerous reports rated as "reliable" detailing the technical characteristics of aircraft which were mostly, if not entirely, fictional. In August 1940, a report mentioned that a new Kinsei engine-powered, mid-wing dive bomber with a retractable landing gear, designated "Type 99," was in production at the Mitsubishi and Aichi factories and was to be used exclusively by the IJAAS.[160] However, Aichi never produced any IJAAS aircraft. Two different dive bombers were given the Type 99 designation, the navy's famous D3A ('Val') and the army's Ki-51 ('Sonia'). The Ki-51 did not have a Kinsei engine while the D3A was used exclusively by the navy. Both were indigenous in origin, though the D3A had dive brakes similar to the German Ju-87. Neither aircraft had retractable landing gear or a mid-wing design.[161] Very possibly the Americans confused these two aircraft and sent a report which blended elements of both, paired with a few erroneous pieces of information. In any case, the naval attaché called the fictional aircraft a copy of a French Dewoitine design with German designed diving brakes.[162] Another erroneous report credited to a "reliable" source of November 1940 claimed that the Zero had two engines arranged in a push-pull configuration. The naval attaché claimed that this fictional

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[159] Mahnken, *Uncovering Ways of War*, 78.
[160] "New Dive Bomber in Production," August 2 1940, *Naval Attaché Records, 1939-1941*, 1940 File 59-124, RG 38, NA.
[161] Francillon, *Japanese Aircraft of the Pacific War*, 178, 271.
[162] "New Dive Bomber in Production."

fighter was based on the Fokker D-23 design.[163] The technical inaccuracy of these reports, while noteworthy, was not their most important failure. Instead, they clearly demonstrated how deep preconceived notions of Japanese unoriginality ran. Aircraft which existed only in American imaginations were given European designs that the Japanese supposedly had copied.

When the Americans received evidence of real Japanese technological innovation, these indicators were ignored. ONI picked up the existence of the B5N1 ('Kate') attack aircraft a year after it first entered service, by chance. The assistant naval attaché for air photographed three B5N1s cruising in formation over Yokohama on July 7, 1939, and provided a remarkably accurate estimate of the aircraft's performance, only underestimating its speed.[164] Four months later, he was allowed to inspect a B5N1 for an hour at a distance of 50 feet. Strangely, his description of the B5N1 was considerably less extensive than his prior report.[165] In 1940, the US military attaché in Chungking sent a detailed performance report of a B5N2, an improved version of the B5N, which the Chinese captured intact and rigorously tested. The technical characteristics were accurate, which was not always true with tests of captured aircraft.[166] However, none of these reports mentioned that the B5N was an entirely indigenous design. Not only that, it was by far and away the world's best carrier-based attack aircraft until mid 1942.[167] This discovery demonstrated that Japan had moved from copying foreign designs, yet no one

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[163] "Airplane Characteristics – Mitsubishi Type Zero Fighter," November 9 1940, *Naval Attaché Records, 1939-1941*, 1940 File 125-202, RG 38, NA.
[164] "New Types of Aircraft," July 17 1939, *Naval Attaché Records, 1939-1941*, 1939 File 89-164, RG 38, NA.
[165] "Type 97 Torpedo-Bomber," November 16 1939, *Naval Attaché Records, 1939-1941*, 1939 File 234-281, RG 38, NA.
[166] "Specifications of Japanese Naval Bomber, Model 97," June 4 1940, *Naval Attaché Records, 1939-1941*, 1940 File 59-124, RG 38, NA; Richard L. Dunn, "ZERO-SEN Model 21 Performance: Unraveling Conflicting Data," in *j-aircraft.com: Japanese Aircraft, Ships & Historical Research*, http://www.j-aircraft.com/research/rdunn/zeroperformance/zero_performance.htm (13 March 2016). Flight tests of captured aircraft often were inaccurate, as was the case with the famous Akutan Zero and another A6M2 Model 21 rebuilt and test flown in China.
[167] Peattie, *Sunburst*, 95. The B5N2 was the version which would later attack Pearl Harbor on December 7, 1941.

who wrote or read the reports made that connection.

In many instances, American views of real Japanese aircraft were confused and contradictory. The G3M medium bomber, which first appeared over China in 1937, was immediately identified as a copy of the German Ju-86. In fact, it was entirely indigenous in origin and superior to the Ju-86 in every way, and also contemporary British and American designs, with the exception of the B-17's prototype. Like all bombers of the time it suffered from weaknesses, such as a lack of armour and defensive armament, but it was a highly capable aircraft.[168] In July 1939, the naval attaché and both of his assistants were allowed to inspect a G3M for one hour at Haneda Airport. They thought the aircraft was "modern, well constructed and a credit to Japanese manufacturing," but assumed it was a "copy of a Heinkel design," with ailerons stolen from Junkers. They also failed to recognise that the aircraft could use both bombs *and* torpedoes.[169] Once again, evidence of Japanese technological innovation was dismissed with claims that an aircraft was a foreign copy. Interestingly, the Americans could never decide from *which* German aircraft company, or aircraft, the Japanese had copied their design of the bomber. The only consistent feature of American assessments was that it *had* to be a copy of something.

Despite mounting evidence to the contrary, both open and classified sources continued to emphasise Japan's lack of technological innovation. In 1941, William D. Puleston, the Director of Naval Intelligence from 1934-1937, published a book comparing the relative military strengths of the United States and Japan. He claimed, without evidence, that contemporary American planes were faster, more manoeuvrable and better designed than their Japanese

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[168] Ibid., 86.
[169] "Description of Navy Heavy Bomber, Type 96," July 26 1939, *Naval Attaché Records, 1939-1941*, 1939 File 165-233, RG 38, NA.

counterparts, partly because Japanese lacked inventive capabilities.[170] These preconceived notions were all the more dangerous because the late 1930s saw the introduction of the aircraft with which Japan opened its war against Britain and the United States. For example, the requirements for the successor to the A5M were outlined in October 1937. They called for a substantial improvement over the A5M in every way, including an increase in range by a factor of two over any contemporary fighter aircraft in the world.[171] This leap in performance was achieved, as the Zero outclassed its predecessor in all characteristics except sustained turning.[172] Sakai recalled his complete shock and elation when his unit, which previously had used A5Ms, was reequipped with Zeros.[173]

Some of the first concrete information concerning the Zero came when, in a rare security lapse, the Japanese allowed the American assistant naval attaché in Tokyo to sit in the cockpit of the aircraft during an aviation exhibit at Haneda Airport in January 1941. He gathered information on the aircraft's weight and engine power, along with the design of its landing gear and the alloy used in the wings and fuselage. His report was met unenthusiastically, some accusing him of underestimating the fighter's weight and overestimating its speed. The preconception that Japan could not develop anything independent of foreign assistance was deeply ingrained, and extremely difficult to break from. Additionally, American aircraft engineers could not understand why the Japanese had opted to build such a light fighter, at odds

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[170] W.D. Puleston, *The Armed Forces of the Pacific: A Comparison of the Military and Naval Power of the United States and Japan* (New Haven: Yale University Press, 1941), 231.
[171] Horikoshi Jiro, *Eagles of Mitsubishi: The Story of the Zero Fighter*, trans. Shojiro Shindo and Harold N. Wantiez (Seattle: University of Washington Press, 1981), 5.
[172] Francillon, *Japanese Aircraft of the Pacific War*, 342, 362.
[173] Sakai et.al., *Samurai*, 53.

with their own design practices.[174] This rare instance of mirror imaging shaping assessments of Japanese air power manifested itself within the discussion of Japanese technological innovation. The Zero's designer, Horikoshi Jiro, constantly looked for news about his aircraft's performance in China, but even one year after it first entered combat virtually no references to it were made in the west.[175] Only classified sources, few and far between, mentioned the new aircraft. Most reports ignored information concerning the Zero and other new Japanese aircraft. Instead, they rehashed the same themes of Japan's lack of innovation.

The capture of a Japanese bomber pilot added further confusion to discussions of the characteristics of the Zero. He informed the Chinese that the Zero was designed to dive on the enemy, then zoom upwards and prepare for another dive, but it was not supposed to engage in extensive combat aerobatics.[176] This comment implied that the Zero was designed as an energy fighter, sacrificing low speed manoeuvrability for improved maximum speed, high speed manoeuvrability, dive speed and other characteristics, rather than a turn fighter. This tactic, the "boom and zoom" technique, relied on maintaining an energy advantage over one's opponent and using it to attack without putting oneself at risk. The prisoner's statement reflected the complaints of early Zero pilots who disliked the aircraft's lack of manoeuvrability compared to its predecessor.[177] IJNAS fighter doctrine also was surprisingly similar to their American counterparts in many ways. It stressed hit-and-run deflection shots and extensive teamwork over

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[174] Mahnken, *Uncovering Ways of War*, 80.
[175] Horikoshi, *Eagles of Mitsubishi*, 107.
[176] Leary, "Assessing the Japanese Threat," 275.
[177] Horikoshi, *Eagles of Mitsubishi*, 85. "Energy" refers to the combination of kinetic and potential energy of an aircraft. Kinetic energy is represented by the aircraft's current airspeed, while its potential energy is represented by its altitude. For example, a pilot can convert his potential energy (altitude) into kinetic energy (speed) by initiating a dive. Aircraft bleed energy in most combat manoeuvres. A low energy aircraft is at a great disadvantage against an opponent with high energy, much like holding the high ground in a land engagement.

traditional dog fighting.[178] However, the Americans interpreted this testimony to mean that the Zero lacked any kind of manoeuvrability, rather than being slightly less agile than the A5M. In an appraisal of Japanese air combat tactics in July 1941, Major Ronald A. Boone stated that from Chinese reports and physical descriptions of the Zero, the aircraft lacked extensive aerobatic capabilities and had a large turning circle.[179]

The Zero commonly is used as *the* example of American observers' failure to recognize Japan's technological capabilities. However, misconceptions shroud its performance to this very day. Every aircraft is a compromise between different aims. No fighter can have excellent performance characteristics in every possible situation and energy state. The designer always must make difficult decisions based on what an aircraft is intended to do. In order to gain the characteristics required in one area, sacrifices must be made in another.[180] For example, an aircraft designed as an interceptor must possess high speed and climb rate in order to catch enemy bombers, at the price of other characteristics, typically range and turn rate. The designer also must work within the constraints of the materials available.

The design of the Zero illustrates this process. The decision to create such a light aircraft stemmed largely from Japan's difficulty in manufacturing high horsepower engines. In order to maintain the necessary power to weight ratio that fuelled the Zero's exceptional performance characteristics, especially its massive range required to effectively operate as a carrier aircraft in the Pacific theatre, an extreme reduction of weight was vital.[181] Weight was reduced by sacrificing self-sealing fuel tanks and armour protection for the pilot. The IJNAS hoped to create

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[178] Lundstrom, *The First Team*, 486.
[179] Leary, "Assessing the Japanese Threat," 275-276.
[180] Murray Rubenstein, *Fighter Combat Study Number One: The Curtiss P-40C vs. The Mitsubishi A6M2 Model 21 Zero-Sen* (Biloxi: Gamescience Corporation, 1976), 2.
[181] Peattie, *Sunburst*, 306.

a fighter so agile and superior to its enemies that it would receive little enemy fire.[182] Many of the Zero's defects stemmed from the shortage of strategic resources in Japan, like high-tensile steel, required to produce high horsepower engines.[183] The *industrial* weaknesses within Japan forced Horikoshi to develop innovative solutions in order to produce performance characteristics well beyond what the small engine would suggest. The A6M2 Model 21 Zero out-classed the F4F-4 Wildcat in nearly every flight parameter, and the Zero would remain the best carrier fighter in the world until the introduction of the Hellcat. What saved the lives of American pilots were their tactics employed and operational circumstances, rather than the Wildcat itself.[184] Joe Foss, an American fighter ace, summarised the superiority of the Zero when he instructed his pilots that "if you were alone and saw a Zero at the same altitude that you were flying that you were outnumbered and should go for home. They were not a plane to tangle with unless you had an advantage."[185]

Once the Japanese lost most of their experienced pilots, the Zero became easier to hit, making the lack of self-sealing fuel tanks and armour on most variants fatal.[186] Given the aircraft's extreme emphasis on low speed manoeuvrability, typified by an exceptionally low wing loading and large ailerons, it sacrificed dive speed and high speed manoeuvrability, two characteristics that became vital as the war progressed. The Japanese attempted to rectify these deficiencies. The A6M5 Model 52c was vastly improved over the A6M2 Model 21 that entered the war, but the Zero's airframe prevented a transition from a turn fighter to an energy fighter.[187]

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[182] Rubenstein, *Fighter Combat Study Number One*, 4.
[183] Peattie, *Sunburst*, 92.
[184] Lundstrom, *The First Team*, 441-442.
[185] Bergerud, *Fire in the Sky*, 202.
[186] Rubenstein, *Fighter Combat Study Number One*, 28.
[187] Francillon, *Japanese Aircraft of the Pacific War*, 362.

Additionally, the Zero's radio failed to work most of the time. Land-based Zero pilots commonly removed them from the aircraft and sawed off the antenna so to reduce weight and improve the aerodynamic profile.[188] Despite these disadvantages, Sakai noted that with a good pilot at the controls, the Zero was still fully capable of competing with the best American designs throughout the war.[189] Indeed, a good pilot can squeeze every last bit of capability from an obsolescent aircraft, while it increases the disadvantages for a poor pilot. A superior aircraft provides greater tactical flexibility, not a trump card. Had Japan been able to cover pilot losses throughout the war, the performance of the air services would not have dropped off so dramatically from 1943.

Viewed in isolation, the underrating of the Zero seems like a minor error. Indeed, American pilots quickly gained an understanding of the Zero from their first combat encounters, without having a model to test. Fredrick M. Trapnell, the man assigned to the Zero project after one was captured in the Aleutians, stated that the tests gave a general impression which matched that already complied from pilot interviews. American pilots began to adopt tactics which helped to level the playing field against the Zero under certain circumstances. One of the strangest tactics was to use the Wildcat's robust armour plate, located behind the pilot's seat, as a "pincushion" for a Zero's fire while another Wildcat moved into position to knock off the attacker.[190] However, the underestimation of the Zero reflected the much broader preconceptions of Japanese unoriginality. Evidence which contradicted this view was belittled or ignored outright, with virtually every combat aircraft the Japanese had in December 1941, like the Zero,

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[188] Sakai et.al., *Samurai*, 114.
[189] Cook and Cook, *Japan at War*, 138.
[190] John B. Lundstrom, *The First Team and the Guadalcanal Campaign: Naval Fighter Combat from August to November 1942* (Annapolis: Naval Institute Press, 2005), 535-536.

the G3M and B5N, the D3A dive bomber, which equalled its foreign contemporaries, the capable G4M ('Betty') medium bomber and the H8K ('Emily'), which was the best flying boat in the world.[191] These preconceptions continued into the war. 'Tony' was selected as the Ki-61's Allied codename because, after first confusing it for a Bf-109 produced under license, the Americans assumed it was a copy of an unknown Italian design due to its superficial European-style appearance.[192] If American assessments had only misconstrued the Zero such an error would have been minor. Instead, the Americans missed the fact that the Japanese air services had an *entire array* of aircraft which matched those in service in the United States. Individual Japanese aircraft may have been better or worse than foreign counterparts for their intended roles, but American assessments assumed a clear and decisive advantage for the western powers across the board, where none existed.

Nor did Japanese technological innovation stop with the attack on Pearl Harbor, despite the assertions of some scholars. Kennedy's otherwise excellent article claims that from 1942, Japan proved incapable of conceiving designs which could compete with the British and Americans, therefore justifying the pre-war dismissal of Japanese technological innovation.[193] This was not the case. Both air services introduced aircraft which matched the best American designs throughout the war, with far fewer resources and lower octane fuel than the Americans had. For example, the J2M3 was an excellent dog fighter despite being designed as an interceptor. It dove much faster than a Zero, had an excellent climb rate not surpassed by a USN fighter until the post-war F8F Bearcat, and was superior to western designs in most other dog

[191] Peattie, *Sunburst*, 94-97.
[192] Francillon, *Japanese Aircraft of the Pacific War*, 112.
[193] Kennedy, "Anglo-American Strategic Relations and Intelligence Assessments of Japanese Air Power," 772.

fighting characteristics due to its combat flaps.[194] When Sakai's unit first received new N1K2-J fighters to replace their Zeros, he enthusiastically recalled that Americans in their Hellcats, not the Japanese, ran for their lives.[195] Numerous other examples could be listed across all classes of aircraft within both air services, except four-engine strategic bombers. The problem was not that leading-edge Japanese aircraft designs were worse than their American counterparts, but that they never were able to replace their aging predecessors in sufficient numbers to matter. The Japanese aviation industry's weakness from 1934-1945 was *never* innovation, but the numerous industrial weaknesses that American reports continuously emphasised just like they did Japan's technological progress. Ian Toll summarises this important distinction by stating that "perhaps nothing was so eloquent as the image of a sleek new fighter plane, gleaming brilliantly in the sun, hauled by a team of oxen over a rutted dirt road, passing unhurriedly over rice fields and through tumbledown villages, from the Nagoya factory where it had been built to the Kagamigahara airfield where it would be tested. It was a practice that would continue through the end of the war."[196]

The Americans dismissed not just Japanese innovation, but its personnel and tactics. American views about the quality of Japanese personnel became increasingly consistent and negative after the start of the war in China. Assessments of Japanese factory workers and mechanics significantly reduced in frequency, and classified reporting on pilots became vague. A discussion between the assistant naval attaché for air and a Japanese officer from the Naval

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[194] *Fighter Combat Comparisons No. 1*, 42.
[195] Sakai et.al., *Samurai*, 337.
[196] Ian W. Toll, *Pacific Crucible: War at Sea in the Pacific, 1941-1942* (New York: W.W. Norton & Company, 2012), 92.

Bureau of Aeronautics contained just a handful of generalisations about flight training.[197] Another vague report compiled eye witness testimony from a group of USN officers, including two aviators, concerning Japanese torpedo bombers practicing drops in Yokohama Bay. The only piece of information was the height with which the drops were conducted.[198] The brief assessment of a bomb, gunnery and torpedo practice mentioned poor results, without providing any details.[199] None of these reports provided new details or revelations. Their tone was that Japan was trying to train its pilots, with limited success. Reports also continued to emphasise Japan's lack of pilot reserves and training facilities. In July 1937, after having been attached to Tokorozawa Army Air Technical School as an instructor, Richard Kellett, a British Flight Lieutenant, reported that the school lacked enough suitable instructors to teach practical flight skills.[200] Puleston noted that the number of Japanese suitable for pilot training programs was far fewer than the United States.[201]

Popular literature took a firmer stand on the skill of Japanese personnel. Fletcher Pratt summarised Japanese pilots as "daring but incompetent aviators." The Japanese racially had defective tubes of the inner ear causing a poor sense of balance and were generally myopic. Therefore their pilots could not improve their abilities. Their native lack of individuality lessened their ability to engage in aerial combat. In general, the Japanese could not produce good aircraft

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[197] "Notes on Japanese Naval Aviation," August 4 1939, *Naval Attaché Records, 1939-1941*, 1939 File 165-233, RG 38, NA.
[198] "Dropping of Aircraft Torpedoes by Japanese Naval Aircraft," September 26 1939, *Naval Attaché Records, 1939-1941*, 1939 File 165-233, RG 38, NA.
[199] A-1-m 15776, "Aerial Operations," August 2 1940, *Naval Attaché Reports, 1886-1939*, Box 68, RG 38, NA.
[200] 2085-908, "Military Aviation - General," July 29 1937, *US Military Intelligence Reports, Japan, 1918-1941*, Reel 30, University Press of America, 3.
[201] Puleston, *The Armed Forces of the Pacific*, 231.

or fly them well, despite "the most heroic efforts."[202] This assessment explicitly used racism to explain Japan's poor quality personnel, which classified sources never did despite all of the shortcomings of American intelligence concerning tactics and technology. However, reliance on national characteristics did become increasingly common. Although Pratt's assessment was entirely incorrect, one point was true. Japanese children received "fewer mechanical toys and less mechanical training" than those of other nations.[203] Japan did lack a large pool of skilled labour to supplement its aircraft mechanics and other vital professions.

Surprisingly little reporting discussed Japanese aerial performance in China. Those few reports provided a more balanced, and accurate, assessment of Japanese capabilities. One reported a "rapid increase" in quality of the IJAAS and IJNAS due to the war, especially the combat experience gained through the operations of large units.[204] Occasionally, Chinese pilots were interviewed on their combat experience against the Japanese. One report from September 1940 concluded that dive bombing by the IJAAS and IJNAS was "very poor," while horizontal bombing had "improved tremendously." Discipline among IJNAS medium bombers was rated "excellent" and the carrier air groups were given particularly high praise. The most important piece of information provided by Chinese pilots was that the Japanese sent fighter escorts with their bombers whenever possible.[205]

Positive reports of Japanese pilots from the naval attaché's office, particularly from Chinese aviators, were rare. Moreover, given the mixed quality of the ROCAF, their views concerning Japanese capabilities easily could be dismissed. The rapid pre-war expansion of the

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[202] Fletcher Pratt, *Sea Power and Today's War* (New York: Harrison-Hilton Books, 1939), 177-178.
[203] Ibid., 179.
[204] 2085-947, "The Capabilities of Japan in Military Aviation," 1-3.
[205] "Comment on Japanese Air Force by Chinese Aviators," September 17 1940, *Naval Attaché Records, 1939-1941*, 1940 File 125-202, RG 38, NA.

ROCAF had been overseen almost entirely by the Italians, and the Chinese carried many of the same flaws as their advisors, like rating all pilots, regardless of ability, as "combat ready" after completing basic flight training. American observers witnessed combat certified Chinese pilots turn into a stall and crash in their trainers.[206] However, the observations of the Chinese pilots were correct and, on occasion, they overcame the Japanese air services by massing greater numbers of aircraft, as in the air battle over Wuhan on April 29, 1938.[207] This foreshadowed the later part of the Pacific War, where American numerical superiority, combined with qualitative advantages, created a series of one-sided slaughters.

Japanese aerial tactics changed significantly during the war in China, but American observers overlooked these changes, and sometimes identified them as weaknesses. Japan's difficulties at the beginning of the war were part of their learning experience in aerial warfare. All other air powers faced similar learning experiences at different times. The IJNAS lost 828 men and 1,169 aircraft in four years of air combat in China, most early on, while Chinese resistance remained high. The bomber branch was the hardest hit since it was initially left unescorted on missions. As a result, the Japanese quickly realised the necessity of fighter escort for bomber aircraft.[208] The same pattern would repeat itself during the Combined Bomber Offensive against Germany.

Due to combat experience, Japanese formations and tactics for fighter aircraft changed radically as well. The shōtai, Japan's basic three-plane formation, was a copy of the British "vic." It was extremely tight, and needed to be loosened in order to increase tactical flexibility.

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[206] Harmsen, *Shanghai 1937*, 30.
[207] Hagiwara, "The Japanese Air Campaigns in China," 245.
[208] Peattie, *Sunburst*, 110, 123.

Larger spacing let individual aircraft manoeuvre freely without being restricted by the close proximity of their wingmen. Similar tactical reforms occurred within all the major air forces.[209] The assistant naval attaché for air noted a squadron of fighters taking off from Yokosuka at night while he entered the harbour in 1939. He complimented the "perfect" formation, but added that it was "very open," implying that instead of being a deliberate and positive change, the Japanese were flying further apart because they could not hold the formation tighter.[210] Another element of the shōtai which may have thrown off foreign observers was the way pilots conducted themselves in combat. The formation was loose, and the wingmen used complex manoeuvres to protect each other. To an outside observer, these manoeuvres appeared disorganised, which was not the case. Whenever one member of a shōtai was attacked, the others would envelop the aggressor.[211]

The combat discipline of individual Japanese pilots increased exponentially with experience. They moved from the "traditional, 1v1 showman like duels" of the First World War to formation-based aerial tactics.[212] The "Chungking Method" was developed in the aerial engagements in the late 1930s. Pilots were trained to engage only when the situation was advantageous, through local numerical superiority, superior energy and/or a state of tactical surprise.[213] Japanese and American aviators were trained along nearly identical lines. Sakai's memoir is full of textbook descriptions of using the same "boom and zoom" tactics which the

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[209] Ibid., 113; Lundstrom, *The First Team*, 487.
[210] "Night Flying Operations of Japanese Naval Planes from Yokosuka," June 8 1939, *Naval Attaché Records, 1939-1941*, 1939 File 89-164, RG 38, NA.
[211] Letourneau and Letourneau, *Operation KE*, 13.
[212] Peattie, *Sunburst*, 125.
[213] Letourneau and Letourneau, *Operation KE*, 13.

Americans employed with great success against the Japanese.[214] The fighter tactics of both nations easily could be interchanged. Both relied on energy fighting, but the Japanese exploited the low speed manoeuvrability of their aircraft when the situation allowed it.

Ironically, the highly manoeuvrable Ki-43 and Zero were ill suited to the type of combat which Japanese pilots adopted. Subsequent versions of the Zero, and all later fighter designs, were adjusted to fit this tactical shift.[215] This early contradiction between tactics and technology was noted by Mogami Sadao, an IJAAS fighter pilot, who praised his Ki-43-I for manoeuvrability, but complained that he could not catch P-40 Warhawks if they refused to enter a turn fight. His unit requested that it be allowed to use captured P-40s, which was denied.[216] Overall, Japanese aerial tactics were as effective at the start of the war as those of their opponents. However, many intelligence reports and open source works claimed that American pilots outclassed their Japanese counterparts. Puleston stated that American personnel were better trained, had a "more natural aptitude for flying" and led the world in naval aviation.[217] In this instance, the Americans would have been better off projecting their tactical capabilities onto the Japanese, but this never occurred.

On September 27, 1940 a handbook on the two Japanese air services was released which summarised American views concerning Japanese air power. The opinion of Japanese pilots was low, attributing the "national tendency" of the Japanese to slow thinking and a dependence on routine as preventing them from training pilots equal to the leading European air powers.[218] The

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[214] Sakai et.al., *Samurai*, 83.
[215] Lundstrom, *The First Team*, 489.
[216] Cook and Cook, *Japan at War*, 86.
[217] Puleston, *The Armed Forces of the Pacific*, 231.
[218] 2085-956, "Handbook on the Air Services of Japan," September 27 1940, *US Military Intelligence Reports, Japan, 1918-1941*, Reel 31, University Press of America, 36.

quality of the maintenance crews within both Japanese air services also was characterised as "low," though the war in China must "obviously have increased maintenance efficiency."[219] Operational experience from the war in China had improved the Japanese system of air power. The air services were unquestionably a "more efficient and formidable force than they were when the war began."[220] However, the fact that the Chinese air force offered little in the way of opposition prevented any overzealous assertions of Japanese mastery of air power. The ROCAF was poorly trained, corrupt and outnumbered in the air battles fought over Shanghai, the only engagements foreigners could observe fully.[221] Generally, Americans assumed that pilots and ground crew began the war poor, but then improved. The handbook never said that the Japanese air services had attained a high level of quality. The implication was that Japanese personnel had improved from being poor to something resembling mediocrity.

The handbook predictably dismissed Japanese technological innovation. The idea of Japanese unoriginality was constantly reiterated. "The quality and performance of Japanese aircraft are improving but reliance is still placed on foreign countries assistance in these aspects."[222] Japanese designers had not reached the level of their European counterparts. "Their undoubtedly efficient machines derive entirely from western models, copied or modified. Thus in this particular, their efficiency vis a vis (sic) western power is limited."[223]

The handbook assessed Japan's fragile industrial base more accurately. Japan's ability to maintain its long air war against China was due to the lack of attacks against Japanese factories,

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[219] Ibid., 63.
[220] Ibid., 79.
[221] Leary, "Assessing the Japanese Threat," 273.
[222] 2085-956, "Handbook on the Air Services of Japan," 79.
[223] Ibid., 110a.

and the ability to freely import the raw materials required to produce aircraft.[224] The handbook detailed the raw materials which Japan could not produce in sufficient quantities within its own borders, and observed that Japan also must import oil and high-quality machine tools to continue expanding its aircraft industry. Estimated figures for Japanese emergency aircraft production were provided, with the qualification that these figures could be maintained for just a few months, due to the limits imposed by a lack of machine tools, raw materials and skilled labour. The aircraft industry was working at full capacity under normal conditions in order to maintain the strength of first line units while building up reserves.[225] In conclusion, Japan had made "great strides" in air power, but it was plagued with numerous weaknesses in production, manpower and a lack of raw materials.[226] Japan's ability to wage a prolonged, attritional and industrialised air war was limited. Ideas of national characteristics and some racial prejudices surfaced in the handbook, but did not determine this overall assessment.

As throughout the interwar period, American intelligence accurately assessed the strategic and industrial side of Japanese air power. Japan's inability to rectify its fundamental problems combined to wreck its air services during the Second World War, just as American observers had predicted. The United States harnessed its overwhelming industrial, financial and demographic strength, and used it to crush Japan. The single largest failure of American intelligence regarding Japanese military aviation was its inability to track the transition from the wholesale copying of foreign aircraft designs to indigenous innovation. The preconception of Japanese unoriginality was a fixture of American reporting. Reports which did not allude to

[224] Ibid., 79.
[225] Ibid., 110-111.
[226] Ibid., 113.

Japanese unoriginality were rare. Anything that did not mesh with that view was ignored or downplayed. All of Japan's main combat aircraft from the late 1930s were indigenous designs. Many of these aircraft had been observed, or test flown, and the information sent back in numerous reports. Yet American observers either misidentified them as foreign copies without evidence, or failed to make the connection between one example of a capable Japanese aircraft design and the wider implication that Japanese industry was self-sufficient, and producing first-rate aircraft. This view combined with strategic surprise and shaped the initial shock which surrounded the capabilities of the Japanese air services during start of the war. A nation which was assumed to possess a large number of obsolescent foreign copies actually had entire fleets of indigenous aircraft that were roughly equivalent to their foreign contemporaries.

Detailed assessments of Japanese personnel became scarce, but had negative conclusions. After the indecision of the early and mid 1930s, American observers concluded that Japanese personnel were of poor quality when they entered the war with China. While that experience increased this level of competence, Japanese pilots and mechanics were viewed as inferior to their western counterparts. Deliberate improvements of Japanese aerial tactics were largely ignored, and occasionally misinterpreted as incompetence. National characteristics became increasingly common in reporting, several assessments concluded that Japanese personnel were inherently inferior *because* they were Japanese, without providing any hard evidence to back up the claim.

The Japanese had become extremely secretive by the late 1930s, and the Americans lost access to many of their traditional sources. Open sources, still stuck in the mindset of the 1920s and early 1930s, came to dominate the reporting. Their views of Japanese industry were accurate, but not of technology and tactics. Official Japanese press releases offered little

meaningful information, and the number of redundant and superfluous reports skyrocketed. The less information the Americans had regarding Japanese military aviation, the more they fell back on the old motif of unoriginality and negative views from the 1920s, with an increasingly harsh tone. However, the assessments of the most important areas remained consistently accurate. The initial shock that the Japanese air services were technologically and tactically first-rate did not prove decisive despite strategic surprise increasing the impact of mistakes made in low level assessments. The industrial and strategic weaknesses of Japan were the deciding factors in the conflict.

CHAPTER 5: AMERICAN INTELLIGENCE ASSESSMENTS OF JAPANESE NAVAL POWER, 1920-1941

The Japanese worked feverishly to increase the capabilities of their naval forces between 1920 and 1941. This process was shaped in large part by the numerical disadvantage institutionalised in the Washington Treaty System. American observers closely followed this effort, and developed a consistently middling picture of the IJN's capabilities. Japanese secrecy was lax for the early part of the interwar period, but became tighter after it withdrew from the naval treaties. American assessments of Japanese naval technology and tactics were mediocre overall, but badly flawed regarding aircraft carriers, light surface forces and the usage of torpedoes. Mirror imaging was common due to an assumption that Japanese technology and tactics would be at most equal to, or more likely worse than, American. Japanese personnel were viewed as competent, but ethnocentrism and ideas of national characteristics permeated the reporting. Discussions of strategic and economic issues, conversely, remained consistently excellent. Despite the mediocre quality of American assessments concerning the operational aspects of Japanese naval power, the accuracy of strategic and economic assessments mattered more over the long term.

Throughout the interwar period, the Japanese remained secretive about the capabilities of their navy. The Americans relied on open sources, chance observations, inspections of Japanese naval facilities and, on rare occasions, tours of Japanese warships. Due to the naval treaties, the numerical strength of the IJN was easy to estimate.[227] Additionally, the naval budgets proposed to the Diet were an important source as they let the Americans accurately track the expansion of the IJN, with the notable exception of the *Yamato*-class battleships. Thus, the 1924 budget for the

[227] Douglas Ford, "US Naval Intelligence and the Imperial Japanese Fleet during the Washington Treaty Era, c. 1922-36," *The Mariner's Mirror* 93:3 (2007): 281.

conversion of *Akagi* and *Kaga*, two incomplete capital ship hulls, into aircraft carriers was listed at 7.7 million yen.[228] In 1937, an American summary of the IJN's order of battle, based solely on naval budgets, was almost entirely correct.[229] Even in the late 1930s, when the Japanese guarded their secrets far more closely, the Americans used budgets and other open sources to detect the laying down of the aircraft carrier *Shōkaku*.[230] This ability to track Japanese naval expansion through the release of annual budgets continued right up to the start of the Pacific War.[231] The Americans followed broad trends in Japanese technological development through naval budgets. In 1927, for example, the American military attaché in Tokyo noted that the IJN had requested three million yen to fit seaplanes on all cruisers, battle cruisers and battleships.[232]

Open sources were a fixture of American reporting on the IJN throughout the interwar period. They provided much general information that proved useful for assessing Japanese thinking. Translations of Japanese naval writers were common. One such report from February 1940 detailed Japanese attitudes toward their numerical inferiority. The writer discussed the relative strength of the IJN and USN, and stated that despite the theoretical tonnage disadvantage of 5:3, the ratio was actually 5:4 because a large number of "obsolescent ships with poor performance" filled USN units.[233] The amount of information gained from open sources raised American suspicion that they were being deceived. A 1938 report suggested that Diet proceedings were censored. Many naval issues were addressed in the closed executive session,

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[228] A-1-u 17242, "Data for Congressional Hearing; Additional Detailed Information on Air Services," 2.
[229] "Japanese Navy Vessels Built, Building or Authorized," January 21 1937, *Selected Naval Attaché Reports Relating to the World Crisis, 1937-1943*, Roll 2, RG 38, NA.
[230] "Japanese Naval Launchings," June 6 1939, *Naval Attaché Records, 1939-1941*, 1939 File 89-164, RG 38, NA.
[231] "Japanese Naval Budgets – Fiscal Year 1940-41," April 4 1940, *Naval Attaché Records, 1939-1941,* 1940 File 1-58, RG 38, NA.
[232] A-1-b 18525, "Airplane on Ships," *Naval Attaché Reports, 1886-1939*, Box 16, RG 38, NA.
[233] "Japanese Naval Writer Discusses United States Navy," February 15 1940, *Naval Attaché Records, 1939-1941*, 1940 File 1-58, RG 38, NA, 2.

and the stenographic recordings of the open session were not published immediately. The American naval attaché noted that the recent press reports were "even more obscure than the vague generalities usually expressed in open session of the Diet," and suggested that the truth perhaps was being distorted.[234] In fact, the disclosed interwar naval budgets were almost always truthful. The Americans only lost firm knowledge of the Third and Fourth Replenishment programs, which stretched into the Pacific War.[235]

American observers tracked Japanese naval expansion through inspections of major shipyards. These inspections were somewhat open in the 1920s, but gradually became less informative as the interwar period progressed. Visits to the Sasebo Naval Arsenal, which specialised in the production of light fleet units, were typical. An inspection of December 19, 1923, was open and casual. The American naval attaché noted a "cordial degree of frankness" when the Japanese answered their questions regarding the naval base. The commander was "very genial and pleasant," spoke English and was friendly toward Americans. The Japanese officers openly expressed their views of Great Britain's "Singapore scheme," which involved the improvement of military facilities in the British possession. The Sasebo commander stated that the project was well within Britain's rights, as Singapore was not included in the Washington Naval Treaty's non-fortification clause. The naval attaché noted, however, that other IJN officers felt the British plans were "contrary to the spirit of the treaty."[236] The naval attaché was able to

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[234] "Naval Policy and Trends from the Diet Proceedings," February 17 1938, *Selected Naval Attaché Reports Relating to the World Crisis, 1937-1943*, Roll 2, RG 38, NA, 1.
[235] "Japan's 'Naval Secrecy' Policy," April 26 1940, *Naval Attaché Records, 1939-1941*, 1940 File 59-124, RG 38, NA.
[236] C-2-a 13755, "Visit to Sasebo Naval Station," January 7 1924, *Naval Attaché Reports, 1886-1939*, Box 404, RG 38, NA, 1; for further details on the Washington Naval Conference, see Erik Goldstein and John H. Maurer, ed., *The Washington Naval Conference, 1921-22: Naval Rivalry, East Asian Stability and the Road to Pearl Harbor* (London: Frank Cass, 1994).

have a lengthy conversation with a Japanese ordnance specialist, who was not "particularly bright, but…seemed to be well informed on navy matters in general." The officer was so forthcoming that the naval attaché suspected a "clever ruse" around the information provided, particularly the admission that Japanese cruisers and destroyers carried at least one spare torpedo for each tube.[237] Not all inspections of the 1920s were so open. In an April 1925 visit to Sasebo, the naval attaché noted that the Japanese officer in charge of the inspection "apparently…had instructions to make the visit a short one." The report itself was short and vague. Requests were made to observe the submarines under construction in the naval yard and the aircraft repair shop, but both of these were denied.[238] None the less, the 1926 inspection contained extensive details about the layout of the naval yard, and was the only Sasebo report over two pages in length.[239] In 1927, the naval attaché listed all of the areas visited at Sasebo, ranging from the apprentice workmen's school, to the dry docks and building ways. Sasebo was a "first class navy yard, but as an industrial plant, it is secondary to Kure and Yokosuka." All ships then under construction were observed, the number of people enrolled in the apprentice school was noted, as were the number and approximate sizes of the dry docks.[240] The 1927 visit was so detailed that the next report, despite the inspection being just as extensive, was short and merely stated that not much had changed.[241] The 1929 inspection was another "general tour" of the facilities. The boilers for new destroyers were shown to American observers, and a Japanese engineering officer provided

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[237] C-2-a 13755, "Visit to Sasebo Naval Station," 2.
[238] C-2-a 13755, "Visit to Sasebo Navy Yard," May 14 1925, *Naval Attaché Reports, 1886-1939*, Box 404, RG 38, NA, 1-2.
[239] C-2-a 13755, "Sasebo Navy Yard," June 2 1926, *Naval Attaché Reports, 1886-1939*, Box 404, RG 38, NA.
[240] C-2-a 13755, "Visit to Sasebo Naval Station," February 18 1927, *Naval Attaché Reports, 1886-1939*, Box 404, RG 38, NA, 1-2.
[241] C-2-a 13755, "Sasebo Naval Station (Visited March March (sic) 26, 1928)," April 9 1928, *Naval Attaché Reports, 1886-1939*, Box 404, RG 38, NA.

their technical characteristics. The Japanese were so forthcoming that arrangements were made to visit the nearby air station even though the Americans had not made that request. The naval attaché "gladly accepted" this offer and observed *Haguro*, a new *Myōkō*-class heavy cruiser, close enough to correct errors in current American renderings of the class.[242]

The beginning of the 1930s saw no appreciable change in the openness of inspections. The 1930 report noted an increase in the number of civilian employees at Sasebo from 6,000 to 7,500. The naval attaché was able to ask one person working on a new destroyer about its propellers. The Japanese officer in charge of the inspection allowed the conversation, and chimed in himself, stating that the propeller pitch was three metres. This statement was confirmed by the naval attaché through direct observation. More significantly, the Americans observed *Asagiri*, a *Fubuki*-class "special type" destroyer, up close as she laid alongside the equipment wall.[243] The last open inspection of Sasebo occurred on February 27, 1931. The naval attaché noted that the largest amount of shipbuilding activity in Japan was occurring at Sasebo, likely because the base was the primary yard used to construct light fleet units, the only ships which Japan could build under the Washington Treaty System at the time. Most of the permanent machinery in the yard was American made, but newer kit had been produced in Japan. A naval constructor informed the Americans that the use of electric welding in warship construction was still in an experimental state and was not yet "trusted" enough to be adopted. Such openness continued throughout the inspection. The Japanese officer in charge of the inspection remarked, without questioning from the Americans, that Japan was having trouble with the fouling of the

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[242] C-2-a 13755, "Sasebo Naval Station (visited May 17, 1929)," June 1 1929, *Naval Attaché Reports, 1886-1939,* Box 404, RG 38, NA, 1.
[243] C-2-a 13755, "Visit to Sasebo Navy Yard (Visited May 9, 1930, by Naval Attaché, Asst. Naval Attaché and Lieut. M.E. Selby, USN)," May 19 1930, *Naval Attaché Reports, 1886-1939*, Box 404, RG 38, NA, 1.

bottoms of ships due to a lack of effective anti-fouling paint. He openly discussed the arrangement of the torpedo armament on Japanese submarines, which was confirmed through direct observation of *I-66*.[244]

The next inspection of Sasebo occurred almost five years later. By this point the "fleet faction" of the IJN, opposed to arms limitation, had overpowered the moderates. Japan had announced its intention to withdraw from the Washington Treaty System. The Americans understood such divisions within the IJN.[245] The 1936 inspection of Sasebo was considerably below what previously had been the norm. Only through direct protest to the commander of the yard were the Americans allowed to enter some of the workshops. The report consisted almost entirely of repeat information. The only new observations were that the yard was "old and dirty" and the aircraft carrier *Akagi* was seen in dry dock undergoing extensive reconstruction. The naval attaché stated that "no information of any value was given" and labelled the inspection as "unsatisfactory." [246]

In preparation for the next inspection of Sasebo, the naval attaché devised a list of information which ONI required concerning the base. It included the layout of the buildings and dockyards, defences, road maps and possible invasion beachheads. Almost the entire list was labelled "incomplete." The defences had been identified in 1922 and 1933, and the naval attaché noted that this information was "relatively recent compared to that of other bases." There were

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[244] C-2-a 13755, "Visit to Sasebo Navy Yard (Visited Febr. 27, 1931)," March 16 1931, *Naval Attaché Reports, 1886-1939*, Box 404, RG 38, NA, 1-2.
[245] E-8-a 6746, "Effect of the Death of Admiral Togo on the Japanese Navy," June 13 1934, *Naval Attaché Reports, 1886-1939*, Box 730, RG 38, NA; for the best account of the power struggle which occurred within the IJN, see Sadao Asada, *From Mahan to Pearl Harbor: The Imperial Japanese Navy and the United States* (Annapolis: Naval Institute Press, 2006).
[246] C-2-a 13755, "Sasebo Naval Station," May 6 1936, *Naval Attaché Reports, 1886-1939*, Box 404, RG 38, NA, 1-2.

no photographs of the base other than three panoramic views of the harbour taken in 1908. ONI also had no map of the city, naval base and surrounding terrain on file. Instead, it relied on a couple of rough sketches from the early 1920s.[247]

When the 1937 inspection did occur, the Americans were denied access to the building ways or dry dock. The dockyard superintendent would only state that Sasebo could construct a cruiser as large as 5,500 tons normal displacement, and that the yard specialised in destroyers, as the Americans had known for years. Despite the restrictions, the inspecting party observed three submarines, the reconstructed fast battleship *Kongō* and, so the naval attaché thought, the heavy cruiser *Myōkō*. All of these vessels were seen from a distance, and no specific information was reported. Large numbers of spare guns, gun shields, barbettes and turrets were observed. The naval attaché concluded that Sasebo was "a most important fleet supply base." Several yard shops were visited, but nothing of interest was seen. Buildings were "generally old" and the machine tools and equipment were not as modern as at Yokosuka. The inspection was deemed "unsatisfactory" because the building ways and dry docks were not visited. The naval attaché noted that "similar restrictions have been encountered at all naval and industrial establishments which are engaged in navy work," but he was surprised that the inspecting party had received a launch ride from one part of the yard to another, allowing for far more observation than otherwise would have occurred.[248]

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[247] C-2-a 13755, "Inventory of Information on Hand and Required: Sasebo, Kyushu, Japan," January 1 1937, *Naval Attaché Reports, 1886-1939*, Box 404, RG 38, NA, 1-2.
[248] C-2-a 13755, "Sasebo Naval Station," May 29 1937, *Naval Attaché Reports, 1886-1939*, Box 404, RG 38, NA, 1-2; John Jordan, *Warships after Washington: The Development of the Five Major Fleets, 1922-1930* (Barnsley: Seaforth Publishing, 2011), 315. Displacement tonnage is the weight of water that a ship displaces while floating. There are four major types of displacement: light, full, normal and standard. Displacements were measured in standard under the Washington Treaty System. The Washington Naval Treaty defines standard displacement as "the ship complete, fully manned, engined and equipped ready for sea, including all armament and ammunition,

Japanese security measures concealed much of the IJN's technological and tactical capabilities. Puleston admitted in 1941 that it was very difficult to determine the technical characteristics of the fleet after 1936.[249] In 1935, the British naval attaché in Tokyo reported that "the whole trouble is I have no knowledge of the weapon efficiency of the [Japanese] Fleet and I doubt if anyone else has."[250] The most famous, though not the most important, example of the failure of western observers to track Japanese technology were the *Yamato*-class battleships. Planning for the construction of the vessels began in the autumn of 1935 and the final design was accepted in July 1936. The class was armed with nine 46cm/45 (18.1") guns, the largest ever mounted on a warship. The *Yamato*-class also had armour arranged in a modern "all-or-nothing" configuration which could withstand fire from 18.1" guns at ranges of 20-35km, as well as significant underwater protection and a top speed of 27 knots. *Yamato* was laid down at Kure yard in 1937, and *Musashi* at the Mitsubishi yard in Nagasaki in 1938. Their final displacement was 64,000 tons, making them the largest battleships ever constructed.[251]

The secrecy surrounding their construction was unparalleled. It began before the vessels were even laid down. The IJN deliberately concealed information in the naval budget only for

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equipment, outfit, provisions and fresh water for crew, miscellaneous stores and implements of every description that are intended to be carried in war, but without fuel or reserve feed water on board." Standard displacement will be used throughout this work unless stated otherwise.

[249] Puleston, *The Armed Forces of the Pacific*, 176.

[250] Christopher M. Bell, "The Royal Navy, War Planning, and Intelligence Assessments of Japan, 1921-1941," in *Intelligence and Statecraft: The Use and Limits of Intelligence in International Society*, ed. Peter Jackson and Jennifer Siegel (Westport: Praeger Publishers, 2005), 149.

[251] David Evans and Mark R. Peattie, *Kaigun: Strategy, Tactics and Technology in the Imperial Japanese Navy, 1887-1941* (Annapolis: Naval Institute Press, 2012), 371-372; Hansgeorg Jentschura, Dieter Jung and Peter Mickel, *Warships of the Imperial Japanese Navy, 1869-1945* (Annapolis: Naval Institute Press, 1977), 38. For naval weapons, the official Japanese measurement in metric will be used for the first mention. Any subsequent mentions will be written in inches for consistency as American observers referred to them as such.

the construction of the *Yamato*-class battleships, hidden behind fictitious destroyers.[252] This action was a significant attempt at deception on the part of the Japanese, as the Americans relied heavily on the naval budgets to track the IJN's procurement. The 18.1" main guns themselves were officially designated "40cm/45 (15.9") Type 94" in an effort to conceal their true size.[253] The Japanese also built large fences around *Yamato*'s building way, and posted guards around the yard to prevent anyone from spotting the vessel while it was under construction. The harbour-facing windows on trains which passed through Kure were covered. Due to the geography of the area, *Musashi* was more difficult to conceal. Large curtains were erected around the yard and a two-story warehouse was built to block the view of the harbour from the American consulate.[254] The technical specifications of the ships were kept on a "need-to-know" basis, which helped to prevent any leaks. Foreign naval officers were not allowed to visit either naval yard. The first westerner to see a *Yamato*-class battleship was the German naval attaché in Tokyo, who was allowed to visit the lead ship in October 1942.[255]

American observers were eager to determine the capabilities of Japan's new capital ships, as the budget provided none of the usual information. In 1938, the American naval attaché in Tokyo collected the opinions of his foreign counterparts regarding the Japanese battleships. He personally believed that Japan had laid down two capital ships which did not greatly exceed 35,000 tons and were armed with 16" guns. However, "persistent reports from abroad,"

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[252] Mark Stille, *Imperial Japanese Navy Destroyers, 1919-45 (2): Asashio to Tachibana Classes* (Botley: Osprey Publishing, 2013), 12.
[253] "Japan: 40 cm/45 (15.9") Type 94, Actual Size 46 cm (18.1")," in *NavWeaps: Naval Weapons, Naval Technology and Naval Reunions*, www.navweaps.com/Weapons/WNJAP_18-45_t94.htm (accessed 15 October 2015); John Prados, *Combined Fleet Decoded: The Secret History of American Intelligence and the Japanese Navy in World War II* (New York: Random House, 1995), 22.
[254] Evans and Peattie, *Kaigun*, 373.
[255] Muir, "Rearming in a Vacuum," 476.

particularly Italy, that Japan was constructing two capital ships considerably larger than 35,000 tons with guns in excess of 16", drove him to review all available information.[256] This revealed the level of professionalism in the naval attaché's office in Tokyo. Despite disagreeing with the rumours, the naval attaché did not let his own preconceptions overrule the evidence which came across his desk. The report concluded that the consensus among foreign naval attachés was that Japan was constructing two battleships of a considerably larger displacement than 35,000 tons and armed with 16" guns, with the possibility of another two ships being laid down soon.[257]

After returning from a trip to Nagasaki in January 1939, the British assistant naval attaché gave the Americans information concerning the Japanese capital ship under construction there. He observed welding lights through the security screens and used them to estimate the length of the hull at over 720 feet. The recently completed enlargement and strengthening of the building way at the Mitsubishi yard in Nagasaki him to conclude that an "extra large and heavy" ship was under construction. He also noted the extreme security around the building way. Workmen were sworn to secrecy. If any fell ill, their jobs were held open until they recovered rather than being filled with a replacement.[258]

The secrecy surrounding the construction of the battleships increased American suspicions that they were larger than 35,000 tons. In June 1939, Hanson Baldwin, the naval correspondent for the New York Times, wanted to get a statement from Japanese sailors that they were not building battleships 45,000 tons or larger. He was against the United States building its

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[256] "Third Replenishment Program (Capital Ship Construction)," January 20 1938, *Selected Naval Attaché Reports Relating to the World Crisis, 1937-1943*, Roll 2, RG 38, NA, 1.
[257] Ibid., 5.
[258] "Capital Ship Construction," January 16 1939, *Selected Naval Attaché Reports Relating to the World Crisis, 1937-1943*, Roll 2, RG 38, NA; Hansgeorg et.al., *Warships of the Imperial Japanese Navy*, 38. The actual length of *Musashi* was 839 feet.

own expensive monsters, and wanted a Japanese statement as ammunition to shut down the USN's ambitions. When he posed this question to the Japanese Navy Ministry, it replied that the IJN could not confirm nor deny that Japan was constructing "super-battleships." The New York Times Tokyo correspondent was told that certain officers in the IJN were willing to state definitely and in writing that Japan was not building, and would never build, "super-battleships," but were overruled by the Navy Minister.[259] On another occasion, an IJN spokesman denied that Japan was building any ships "of 40,000 or 45,000 tons." This statement was technically correct, and one of the Japanese admirals present "was unable to suppress a smile."[260]

A July 1939 report stated again that the workmen at the Mitsubishi yard in Nagasaki were sworn to secrecy and "do not confide even to relatives." The conclusion was that one, and possibly two, large ships were being constructed at the yard.[261] In October 1939, the naval attaché reported that Japan was constructing eight capital ships. The estimated displacement of the ships increased from around 35,000 tons to 40,000-43,000 tons with an armament of twelve 16" guns. This may have been a case of mirror imaging, as American design had moved toward such an armament, as opposed to a smaller number of larger calibre guns. This concept would later be represented in the *Montana*-class battleship design. The entire report clearly received much attention, as large portions were highlighted, underlined and check marked.[262]

The mystery surrounding the new Japanese capital ships extended into open sources and

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[259] "New York Times Tries to Obtain Statement Regarding Japanese Program," June 16 1939, *Naval Attaché Records, 1939-1941*, 1939 File 89-164, RG 38, NA.
[260] Muir, "Rearming in a Vacuum," 476.
[261] "Shipbuilding Activities in the Nagasaki Area," July 3 1939, *Naval Attaché Records, 1939-1941*, 1939 File 89-164, RG 38, NA.
[262] "Japanese Capital Shipbuilding Program," October 11 1939, *Naval Attaché Records, 1939-1941*, 1939 File 165-233, RG 38, NA, 1-2; Roger Chesneau, ed., *Conway's all the World's Fighting Ships, 1922-1946* (London: Conway, 1980), 100.

popular literature. Pratt stated that turrets which could fit multiple 18" guns were technologically impossible. In a clear case of mirror imaging, he claimed that since the USN's new battleships would be armed with 16" guns, the Japanese would follow suit. Therefore, "rumor is pretty clearly a liar in this instance."[263] Puleston dismissed the rumours that Japan was constructing 45,000 ton battleships with 18" guns as "improbable."[264] Ultimately, the Americans failed to discover the characteristics of the *Yamato*-class battleships until very late in the war. As late as December 1944, ONI still listed *Yamato* as having nine 16" guns and displacing 45,000 tons, paired with a crude line drawing of its original, rather than late-war, configuration.[265] A brief mention in the USN's official history seems to suggest that the Americans developed a more realistic assessment of *Yamato*'s armament before its final sortie in April 1945. Samuel Eliot Morison states that on the morning of April 7, "staff officers familiar with range tables took care to remind others that *Yamato*'s 18.1-inch guns should have a maximum range of 45,000 yards, as against 42,000 for the 16-inch gunned battleships in Deyo's force and 37,000 for *Tennessee*."[266] Therefore, at some point between December 1944 and April 1945, the Americans had determined the true size of *Yamato*'s main armament.

The American failure to identify these capabilities earlier proved irrelevant. Both *Yamato* and *Musashi* spent the decisive years of the war sitting idle before being sunk by aircraft, *Shinano* was completed as an aircraft carrier and construction on Hull No. 111 stopped in March

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[263] Pratt, *Sea Power and Today's War*, 190.
[264] Puleston, *The Armed Forces of the Pacific*, 211.
[265] "ONI 41-42 I: Index to all Japanese Naval Vessels," in *Japanese Naval Vessels of World War Two as seen by U.S. Naval Intelligence*, ed. A.D. Baker III (Annapolis: Naval Institute Press, 1987).
[266] Samuel Eliot Morison, *History of United States Naval Operations in World War II*, 15 vols. (Annapolis: Naval Institute Press, 2010), 14: 204.

1942.[267] In the greatest success achieved by a *Yamato*-class battleship, at the Battle of Samar in October 1944, *Yamato* straddled the escort carrier *USS White Plains* with her second salvo and scored the longest range hit by a battleship in history with her third salvo at 31.6km.[268] Malcolm Muir argues that the failure to determine the capabilities of the *Yamato*-class battleships drove the Americans to rearm against "irrelevant benchmarks," such as the expiring naval treaties and British ships the United States would never fight.[269] This is a valid point, but requires some additional qualification. The design of new American battleships in the late 1930s was still bound to the Second London Naval Treaty, regardless of when it was set to expire. Rumours that the Japanese were building ships in excess of 45,000 tons meant the Americans, British and French had already invoked the escalator clause, which raised the restriction on displacement from 35,000 to 45,000 tons and armament from 14" to 16". Even so, the new American battleship designs focused primarily on the speed required to escort the aircraft carriers and protect them against Japan's *Kongō*-class fast battleships. The one design which would have been capable of engaging *Yamato* or *Musashi* in an even fight, the *Montana*-class, was constantly delayed due to the diversion of steel allocations to the construction of additional aircraft carriers. The *Montana*-class vessels were finally cancelled in July 1943 as the USN realised there was no longer a need for extremely large and slow battleships.[270] The misunderstanding of *Yamato* and her sister would have been far more vital *if* they had been used more effectively during the war,

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[267] Hansgeorg et.al., *Warships of the Imperial Japanese Navy*, 39.
[268] Robert Lundgren, *The World Wonder'd: What Really Happened off Samar* (Ann Arbor: Nimble Books, 2014), 35; Evans and Peattie, *Kaigun*, 263. It could also be argued that this was a near miss since the shell likely never made physical contact with the hull of *White Plains*. However, this would be imposing the practices of western navies on the Japanese. This author considers it a hit as the Type 1 AP shell which was used performed exactly as designed, having been optimised for underwater trajectories, and Japanese fire control doctrine stressed the desirability of short near-misses. *White Plains* was badly damaged by the hit since a non-contact detonation under the keel is one of the most damaging kinds of attack possible against a surface ship.
[269] Muir, "Rearming in a Vacuum," 480.
[270] Chesneau, ed., *Conway's all the World's Fighting Ships*, 97-100.

but this did not occur in reality.

American efforts to track the development of the remainder of the Japanese battle line proved far more successful. The Japanese modernised their aging capital ships from the mid 1920s through the mid 1930s, adding torpedo bulges, oil-fired boilers, strengthened armour, increased gun elevation, improved fire control and their famously tall "pagoda" superstructures.[271] The most dramatic modernisations occurred with the *Kongō*-class battle cruisers, including an increase in speed from 26 to 30 knots, after which they were reclassified as fast battleships.[272] The four reconstructed *Kongō* sisters would be the most active Japanese capital ships during the war.

The Americans accurately tracked most of these changes, but missed the resulting increases in displacement, which were underrated by several thousand tons. The most notable error was the failure to notice the dramatically increased speed of the *Kongō*-class battleships.[273] The modernisation of *Hiei*, one of the *Kongō* sisters, was of particular importance since it had previously been demilitarised and turned into a training ship as part of the London Naval Treaty. In April 1940, the naval attaché in Tokyo reported *Hiei's* remilitarisation. It had been "brought up to the standard of the other sisters," and its speed possibly exceeded 27 knots.[274] Puleston also noted *Hiei's* reconstruction, but considered it "very doubtful" that her full strength could have been restored.[275]

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[271] Evans and Peattie, *Kaigun*, 255.
[272] Ibid., 276; Hansgeorg et.al., *Warships of the Imperial Japanese Navy*, 35.
[273] "ONI 41-42: Japanese Naval Vessels," in *Japanese Naval Vessels of World War Two as seen by U.S. Naval Intelligence*, ed. A.D. Baker III (Annapolis: Naval Institute Press, 1987); see Hansgeorg et.al., *Warships of the Imperial Japanese Navy*.
[274] "Remilitarization of H.I.J.M.S. Hiei," April 20 1940, *Naval Attaché Records, 1939-1941*, 1940 File 59-124, RG 38, NA.
[275] Puleston, *The Armed Forces of the Pacific*, 181.

The only Japanese battleships for which the Americans had accurate speed figures were the *Nagato* and *Yamato*-classes, because American signals intelligence listened in on *Nagato's* 1936 post-modernisation speed trails.[276] The new speed was 25 knots, which was actually slower than her pre-modernisation speed of 26.7 knots. However, this intelligence created concern within the USN, which had assumed the class was only capable of 23.5 knots. In response, the General Board increased the maximum speed required for the *North Carolina*-class battleships to 27 knots, and to 28 knots for any class after them.[277] Overall, the Americans accurately tracked the general capabilities of the Japanese battle line. They only made a few errors, none of which proved to be of critical importance during the war.

While the large capital ships garnered the most attention from American observers, Japan was most innovative in its development and use of cruisers, destroyers and submarines. Its most notable design of the 1920s was the *Fubuki*-class destroyers, built from 1926-1931. They represented such a massive leap in capability over previous designs that the Japanese classified them as "special type." They were the largest and most advanced destroyers in the world at the time. Their armament consisted of nine 61cm (24") torpedo tubes in triple mounts and six 12.7cm/50 (5") guns mounted in twin turrets which were weather and splinter proof as well as gas tight, the first such mountings ever used for a destroyer.[278] Captain Hara Tameichi recalled that Japanese destroyer captains at the time believed the supremacy of their destroyer fleet would

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[276] "ONI 41-42 I: Index to all Japanese Naval Vessels;" "ONI 41-42: Japanese Naval Vessels."
[277] Lawrence S. Safford, "A Brief History of Communications Intelligence," in *Listening to the Enemy: Key Documents on the Role of Communications Intelligence in the War with Japan*, ed. Ronald H. Spector (Wilmington: Scholarly Resources, 1988), 9; Hansgeorg et.al., *Warships of the Imperial Japanese Navy*, 28; Chesneau, ed., *Conway's all the World's Fighting Ships*, 97-98. The *North Carolina*-class ended up being capable of 28 knots, while the later *South Dakota*-class was actually half a knot slower.
[278] Evans and Peattie, *Kaigun*, 221.

overcome the disadvantage of the naval treaties.[279] Japan's reliance on light fleet units did not go unnoticed by the Americans. The Japanese openly bragged about the strength of their light forces, one publication claiming that the United States could not cope with Japanese heavy cruisers.[280] Puleston noted that the IJN had focused on building "a powerful fleet of auxiliary ships to compensate for the deficiency in capital ships" institutionalised under the Washington Naval Treaty.[281]

Despite this fact, the Americans sent back few reports concerning Japanese submarines and destroyers. These reports tended to be short on details. In November 1936, the American naval attaché sent a report concerning a Japanese naval review which he had attended. Japan's destroyers and submarines were observed during the proceedings. If they were as powerful as they looked, "we should beware" as both appeared to be "very effective types."[282] Although the naval attaché was struck by the appearance of these vessels, no detailed analysis or follow up reports surfaced. The shortage of information in open sources was even more acute. In 1941, Puleston erroneously claimed that some Japanese destroyers might be using 5.5" guns. He may have confused the armament of Japan's destroyers with that of their light cruisers, which mounted 14cm/50 (5.5") guns.[283]

American attempts to track the development of Japanese cruisers also proved difficult. The prototype for Japan's interwar and wartime cruisers, the experimental light cruiser *Yūbari*,

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[279] Tameichi Hara, Fred Saito and Roger Pineau, *Japanese Destroyer Captain: Pearl Harbor, Guadalcanal, Midway — The Great Naval Battles as Seen Through Japanese Eyes* (Annapolis: Naval Institute Press, 2011), 29.
[280] F-10-d 20494, "Forwarding Publication 'Japanese Submarines' by T. Ikezaki," September 6 1930, *Naval Attaché Reports, 1886-1939*, Box 888, RG 38, NA, 9.
[281] Puleston, *The Armed Forces of the Pacific*, 36.
[282] F-10-d 20618-C, "Special Grand Naval Review," November 11 1936, *Naval Attaché Reports, 1886-1939*, Box 880, RG 38, NA, 4.
[283] Puleston, *The Armed Forces of the Pacific*, 204.

was laid down in 1922 under extremely ambitious requirements. It was designed to have the same speed, radius of action and broadside of guns and torpedoes possessed by Japan's preceding light cruisers, with only 57% of their displacement.[284] The resulting ship was so peculiar that it confounded the American naval attaché when he first saw it at Sasebo in 1923. He sketched a rough outline of the vessel for visual recognition purposes and wrote a lengthy description. *Yūbari* was "a very odd looking craft." According to the naval budget it had been built as an experiment, but his endeavour to discover the nature of the experiment proved fruitless. The naval attaché guessed that *Yūbari's* primary purpose was mine laying while its bizarre appearance was an attempt to make range finding difficult for the enemy.[285] Neither guess was correct. The purpose of her construction was to build a small cruiser with the capabilities of a larger one. The experiment was successful save for one crucial issue: *Yūbari* was over her designed weight by 419 tons, nearly 14% of the total displacement. The problem reduced her speed and endurance, but stability remained acceptable.[286] This issue occurred with every Japanese interwar cruiser design after her, along with many of Japan's destroyers and torpedo boats, reaching its zenith with the *Mogami*-class cruisers.

The *Mogami*-class posed one of the most complicated technical questions to American observers during the interwar period. Japanese secrecy, combined with deception and unintentional disastrous design errors, clouded the actual capabilities of the vessels well into the war. The signing of the London Naval Treaty in 1930 brought restrictions on the number of cruisers the signatories could construct. Japan had reached its tonnage limit in heavy cruisers and

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[284] Eric Lacroix and Linton Wells II, *Japanese Cruisers of the Pacific War* (Annapolis: Naval Institute Press, 1997), 41.
[285] C-2-a 13755, "Visit to Sasebo Naval Station," 2-3.
[286] Lacroix and Wells, *Japanese Cruisers of the Pacific War,* 44.

could construct only new light cruisers under the treaty.[287] Officially it accepted these restrictions and set out to build four 8,500 ton light cruisers armed with 15 15.5cm/60 (6.1") guns.[288] In secret, the NGS demanded that the *Mogami*-class be able to rapidly switch the 6.1" guns for 20cm/50 (8") guns in the event Japan withdrew from the Washington Treaty System. It demanded capabilities virtually identical to those of 10,000 ton heavy cruisers, on ships intended to be 1,500 tons lighter. Large scale electric welding of the hull, machinery and fittings was to be used in an effort to save weight. Even so, the paper design proposed by the naval architects was already 1,000 tons heavier than the original requirement.[289] Once completed, *Mogami* displaced 11,169 tons normal, breaking the treaty limits and displacing far more than the Japanese intended or announced.[290]

The NGS's tendency to demand that Japan's naval architects cram too much capability onto too small a displacement abruptly ended in 1934-1935, with a series of embarrassing, and public, disasters. On March 6, 1934, *Tomozuru*, a new torpedo boat, went out on exercise with its squadron. Six days later, the squadron was hit by a large storm and the exercise was called off. During the attempt to reach Sasebo, *Tomozuru's* roll reached 40-45º before it capsized and floated bottom up. The cause was determined to be severe weather exacerbated by *Tomozuru's* lack of dynamic stability, due to the ship being well over the designed weight.[291] In March 1935, *Mogami* began sea trials where the ship *literally* burst at the seams. Frames and side stringers

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[287] Ibid., 434. Under the London Naval Treaty, light cruisers could carry guns up to and including 6.1". Heavy cruisers could carry guns up to 8". Neither class of vessel could exceed a 10,000 ton displacement.
[288] Evans and Peattie, *Kaigun*, 239.
[289] Lacroix and Wells, *Japanese Cruisers of the Pacific War*, 437.
[290] Hansgeorg et.al., *Warships of the Imperial Japanese Navy*, 84; Jordan, *Warships after Washington*, 108-152. All the signatories of the Washington Naval Treaty had difficulties with the design and construction of 10,000 ton treaty cruisers, but Japan's problems were the most acute.
[291] Lacroix and Wells, *Japanese Cruisers of the Pacific War*, 719.

near the propellers were distorted, attached shell plates loosened and several fuel tanks ruptured. The side plates in the bow buckled and the entire hull distorted because of wave action, which damaged the training of two turrets. Many of the welds used as a weight saving measure failed spectacularly.[292] The ship nearly sank itself simply by sailing.

While the IJN was still reeling over these debacles, the Fourth Fleet Incident occurred. On September 26, 1935, the Fourth Fleet encountered a typhoon while on exercise. Many ships, including two *Mogami*-class cruisers, suffered heavy damage. The rolls for *Fubuki*-class destroyers reached upwards of 70º, and the entire bow section of *Yūgiri* was broken off forward of the bridge. An investigation concluded that many light fleet units were structurally suspect. Sweeping changes were made among all units of the fleet, except battleships and carriers, and future designs were revised to incorporate these lessons, eased by Japan's withdrawal from the Washington Treaty System, a root for these design failures.[293] The *Mogami*-class received the most extensive changes, including the replacement of almost all welded joints with riveted ones.[294] This reconstruction brought the class up to just shy of 13,000 tons, the size that the design requirements should have demanded in the first place, despite such large cruisers being banned under the Washington Treaty System.[295] Instead, the NGS paid lip service to the treaties while imposing design requirements on the naval architects which were impossible to fit within such restricted displacements. The result, like with the *Mogami*-class, were ships which badly violated the treaty *and* missed out on many of the benefits of doing so as they had not been

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[292] Ibid., 440.
[293] Ibid., 721-724.
[294] Ibid., 441-442.
[295] Hansgeorg et.al., *Warships of the Imperial Japanese Navy*, 85; Jordan, *Warships after Washington*, 144-146. Italy willingly broke treaty limits with the design and construction of the *Zara*-class heavy cruisers in order to maximise their combat power.

originally designed to take full advantage of their increased size.

American observers learned of these disasters in Japanese warship design. The failures were so public that open sources discussed them in detail. In a supremely smug tone, Pratt described the doomed voyage of *Tomozuru*. The Japanese were proud of their design, but when the ship went sea, "there was another tune to sing." The first time she hit a swell, the ship capsized due to her excessive top weight. Many foreign naval observers held that this defect ran through the whole IJN.[296] Pratt's description was semi-fictionalised and played up events for comedic effect. However, the *Tomozuru* Incident gave observers reason to believe the Japanese were struggling to build a capable fleet.

The problems which plagued the *Mogami*-class, combined with the NGS's intentional deception regarding the main armament, fooled American observers into dramatically underestimating their capabilities. Pratt relayed the story of *Mogami's* disastrous sea trials with its welded hull, concluding that "the whole story is typical. The Japanese are extremely ingenious at thinking up clever tricks, but the ocean, an institution without a psychology, persistently refused to be tricked." He argued that the *Mogami*-class' welded hull was impossible to fix, while the latest reports indicated two of the ships had one turret removed and the others were being modified to carry fewer guns.[297] Similarly, in 1940, United States Naval Institute proceedings debated whether one or more turrets had been removed to improve the ships' seaworthiness.[298] In fact, the *Mogami*-class, after having most of their welded joints replaced, were successfully up-gunned to 8". This was admitted publicly by Vice Admiral Baron Hiraga

[296] Pratt, *Sea Power and Today's War*, 176.
[297] Ibid., 176-177.
[298] Prados, *Combined Fleet Decoded*, 29.

Yuzuru, one of Japan's most important naval architects.[299]

This change did not go unnoticed by the American naval attaché in Tokyo. In April 1940 he stated that the *Mogami*-class had been fitted with ten 8" guns. He correctly noted that the class had been designed for this modification from the beginning, and had carried 6" guns only to evade the treaty restrictions. The information was reliable, since two of the ships had been sighted with new guns.[300] This was possibly the most accurate and detailed technical report on the Japanese surface fleet to come from the office in years. However, the Bureau of Ordnance immediately dismissed the report, stating that the ship's design could not tolerate the weight of the new turrets.[301] In 1941, Puleston stated that the *Mogami*-class were armed with 6" guns and displaced 8,500 tons.[302] Yet the ships had never displaced that amount, even in paper form. The disastrous sea trails reinforced the American belief in the official figure. They assumed the ships were barely seaworthy light cruisers, while the Japanese had successfully reconstructed them into capable heavy cruisers which would do great service during the war. The Americans would not learn their true capabilities until the burning wreck of *Mikuma*, one of the four *Mogami*-class ships, was photographed after the Battle of Midway. Interestingly, the photographs were all that was needed to reach an accurate estimate of the *Mogami*-class' displacement.[303] Ironically, the Americans likely would have assessed the ship's capabilities accurately before the war if the initial Japanese design had not been so badly flawed.

Details regarding other Japanese heavy cruisers also were scarce. The 1936 naval review

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[299] Lacroix and Wells, *Japanese Cruisers of the Pacific War*, 442; Prados, *Combined Fleet Decoded*, 29.
[300] "Re-gunning of Mogami Class Cruisers with 8-Inch Guns," April 8 1940, *Naval Attaché Records, 1939-1941*, 1940 File 1-58, RG 38, NA.
[301] Mahnken, *Uncovering Ways of War*, 70.
[302] Puleston, *The Armed Forces of the Pacific*, 189.
[303] Prados, *Combined Fleet Decoded*, 30; "ONI 41-42: Japanese Naval Vessels."

gave a rare opportunity to see many Japanese vessels up close. However, the visibility was poor due to the weather, which prevented the details of warships from being accurately observed. The American naval attaché was disappointed until he was unexpectedly transferred from the demilitarised battle cruiser *Hiei* to a *Takao*-class heavy cruiser for the return trip. Despite being physically onboard the ship, he noted only the extraordinarily large size of its superstructure, which presented a much larger silhouetted area than USN cruisers.[304] ONI's wartime identification and characteristics handbook accurately rendered the appearance of Japan's cruisers. Simple and racist rhymes helped American officers recognise them: "the Nips big cruisers' forward stack is always fat and falling back." However, every heavy cruiser class was underestimated in displacement, speed or both.[305]

The strangest intelligence failure involved numerous "reliable" reports stating the Japanese were constructing very large cruisers. These ships allegedly displaced approximately 17,000 tons and were armed with eight 11" guns.[306] One British report, based on an informant at Yokosuka Dockyard, included a sketch of one of the vessels, further details about its characteristics and referred to it as a "pocket battleship," the famous nickname for Germany's *Deutschland*-class cruisers. Construction of the vessel had allegedly been halted and it was implied that the informant had observed the ship's hull directly.[307] In response to such "reliable" intelligence, the Americans ordered six *Alaska*-class large cruisers to counter the threat.[308] However, the Japanese large cruisers were entirely fictional. Such a class of warship had never

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[304] F-10-d 20618-C, "Special Grand Naval Review," 1-2.
[305] "ONI 41-42: Japanese Naval Vessels."
[306] 2342-192, "Ship Construction," February 14 1941, *US Military Intelligence Reports, Japan, 1918-1941*, Reel 26, University Press of America.
[307] 2342-192, "Yokosuka Dockyard," May 31 1941, *US Military Intelligence Reports, Japan, 1918-1941*, Reel 26, University Press of America.
[308] Chesneau, ed., *Conway's all the World's Fighting Ships*, 122.

been designed, much less laid down. Japanese naval intelligence learned of the *Alaska*-class and, ironically, the NGS ordered six "Super A" large cruisers in response.[309]

Torpedoes were an issue closely linked to the combat capabilities of Japanese light fleet units. The Americans tried in vain throughout the interwar years to determine the quality of Japan's torpedoes. The Type 93 oxygen-fuelled torpedo, unofficially called the 'Long Lance' in the west, debuted in fleet service in 1935, is rightfully the centrepiece of this question. The Japanese began experimenting with oxygen-fuelled torpedoes in 1924, but a successful design was not accepted until 1933. It had a payload of nearly 500 kg and could reach speeds up to 48 knots and ranges up to 40 km, depending on the settings used. Additionally, the torpedo left almost no visible wake, which made it difficult to detect. The Type 93 was the best surface launched torpedo in the world, and was several orders of magnitude better than the American Mark 15, when the latter worked at all.[310] However, the problem of assessing torpedoes stretched back. The *Nagara*-class light cruisers built from 1920-1924 were the first ships in the IJN to use 24" torpedoes, followed by the *Mutsuki*-class destroyers, built from 1924-1927, which also carried 24" torpedoes.[311] Large torpedoes were used on every subsequent Japanese cruiser and destroyer design.

The Americans constantly sought to determine the size and capabilities of Japanese torpedoes, but secrecy and deception prevented them from gathering concrete evidence. Additionally, a belief that the Japanese must be technologically inferior to the United States

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[309] Lacroix and Wells, *Japanese Cruisers of the Pacific War*, 605-606. The "Super A" cruisers were ordered under the Fifth and Sixth Replenishment programs. A design was finalised, No. B-65, but none of the vessels were laid down.
[310] Evans and Peattie, *Kaigun*, 267-270.
[311] Lacroix and Wells, *Japanese Cruisers of the Pacific War*, 38; Jordan, *Warships after Washington*, 269.

made it easy to reject any reports that indicated otherwise.[312] The most striking example came from the first time the American naval attaché and his assistant's inspected Japan's main torpedo school in March 1937. The school's instructors conducted all research and experimentation connected with torpedoes and mines, allegedly under the direction of the Navy Minister. The Japanese lied in response to numerous direct questions regarding torpedoes. They stated that although modifications and experiments constantly were being conducted, no successful innovation had been accepted. An electrically operated torpedo had been produced, but abandoned. The Japanese denied experiments regarding "other types of trackless torpedoes," such as oxygen-fuelled variants. When the Americans asked whether any torpedo larger than 21" was under consideration, the Japanese answered that any such torpedo would be very cumbersome, and could not be used on destroyers due to the limitation of space. The last question seemingly shook the Japanese, and "a hurried visit" was made to a 21" torpedo of Japanese manufacture, which the officer in charge of the inspection stated was in service aboard destroyers.[313] The Americans accepted these lies without hesitation, as they reinforced the views they already held.

Any reports which furthered the belief that the Japanese were using only conventional 21" torpedoes were passed along. One report stated that the IJN had made a large purchase of 21" torpedoes for their submarines and destroyers through the Italian government in September 1939. This report was possible as Japanese submarines and very old destroyers used 21" torpedoes, but the Americans took it as an indication that *all* Japanese light surface forces did

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[312] Mahnken, *Uncovering Ways of War*, 64.
[313] E-8-a 1752, "Naval Torpedo School," March 15 1937, *Naval Attaché Reports, 1886-1939*, Box 726, RG 38, NA, 1-2; Carl Boyd and Akihiko Yoshida, *The Japanese Submarine Force and World War II* (Annapolis: Naval Institute Press, 2002), 37. The Japanese had an electric torpedo, the Type 92, in service with their submarine fleet since 1932.

so.[314] A number of reports indicated the Japanese were using 24" torpedoes, and in April 1940 the naval attaché suggested Washington should take them seriously. The latest Japanese destroyers were rumoured to carry 24" torpedoes. Such reports were impossible to verify, but the sheer number of sources which indicated that this might be the case "appears to be significant."[315] The Americans never discovered the size, much less the capabilities, of the torpedoes used by most Japanese light surface forces. Not until April 1943, over 20 years since they had been accepted into service, did ONI acknowledge that Japan was using 24" torpedoes.[316]

The other aspect of the torpedo question, overlooked by historians and American observers at the time, was the *quantity* of torpedoes the Japanese intended to use. Japanese cruisers and destroyers carried a large number of reloads, as torpedoes were considered the fleet's primary weapon in a night action. Due to Japan's lead in torpedo technology, particularly in range, the survivability of destroyers during a fleet action was considered high enough to justify carrying reloads.[317] Japan also was the only nation which could quickly reload torpedoes in combat. By 1936, a system using a compressed-air motor could reload the tubes in 3-5 minutes.[318] In contrast, the Americans had abandoned the torpedo on their cruisers, and their destroyers could not carry any extra torpedoes.[319]

Few American reports mentioned that the Japanese carried reloads, and none suggested

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[314] "Japanese Naval Torpedoes for Submarines and Destroyers," September 11 1939, *Naval Attaché Records, 1939-1941*, 1939 File 165-233, RG 38, NA.
[315] "Notes on Japanese Torpedoes," April 22 1940, *Naval Attaché Records, 1939-1941*, 1940 File 59-124, RG 38, NA.
[316] Prados, *Combined Fleet Decoded*, 31.
[317] Evans and Peattie, *Kaigun*, 280; Jordan, *Warships after Washington*, 283.
[318] Lacroix and Wells, *Japanese Cruisers of the Pacific War*, 248.
[319] Jordan, *Warships after Washington*, 132.

that they could reload in combat. The naval attaché drew attention to the reload issue in 1940 by claiming that all Japanese light surface forces carried three torpedoes for each tube, but this report was ignored.[320] ONI's wartime identification and technical handbook omitted the reloads for almost all Japanese vessels, and even failed to include torpedo storage containers on most identification drawings of Japanese destroyers.[321] This was a dangerous underestimation, as much American reporting relied on bean counting. They compared the quantity of weapons available to the USN and IJN, right down to the number of gun barrels and torpedo tubes. Mirror imaging was rampant in such calculations. After a lengthy breakdown of this fashion, Puleston gave American destroyers the advantage because they had more torpedo tubes. However, this estimation was wrong because he assumed the Japanese did not carry reloads, which doubled their torpedo complement in most cases, and that Japanese torpedoes were as good as American ones.[322]

The problem was worsened because the Americans badly miscounted the number of torpedo *tubes* on many Japanese cruisers. The most egregious miscalculation concerned the *Takao*-class heavy cruisers. In October 1942, the Americans assumed the class carried twin 21" torpedo mounts, for a total of eight 21" torpedo tubes. In actuality, the *Takao*-class carried quadruple 24" torpedo mounts, for a total of 16 tubes.[323] In total, the Americans underestimated the number of torpedoes which Japanese light surface units could fire in a given battle by over 100%, and grossly miscalculated their combat power.

The primary role of the Japanese light surface forces was to launch large night time

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[320] "Notes on Japanese Torpedoes."
[321] "ONI 41-42: Japanese Naval Vessels."
[322] Puleston, *The Armed Forces of the Pacific*, 196.
[323] "ONI 41-42: Japanese Naval Vessels;" Hansgeorg et.al., *Warships of the Imperial Japanese Navy*, 83.

attacks against the American battle line. Their design and weapons centred on their use in night combat. During the interwar years, the Japan Optical Company produced several optical devices which were among the best in the world, especially powerful binoculars optimised for viewing at night. The Japanese also led the world in the development of night time illumination, with the introduction of star shells equipped with parachutes in 1935. The USN's official history praises these innovations and notes that Japanese binoculars in particular were highly sought after by American naval officers during the war.[324]

The heavy cruiser divisions, a torpedo cruiser division, the *Kongō*-class fast battleships and the destroyer divisions were formed into the Night Battle Force in 1936 and received special training to conduct massive attacks at night.[325] The emphasis on night time attacks shaped the structure of Japanese destroyer units, which were up-scaled versions of their western counterparts. While western navies had large destroyer leaders to command a group of smaller destroyers, the Japanese "special type" destroyers were as large as western destroyer leaders, and were headed by light cruisers.[326] In a typical night battle scenario, upon sighting the enemy, the force commander ordered all units into positions for encirclement. Then heavy and torpedo cruisers fired a criss-crossing spread of 130 Type 93s at long range. As these torpedoes reached the American force, knocking out several ships, the Night Battle Force would close in and engage with guns while searchlights and parachute flares illuminated the enemy. The heavy cruisers and fast battleships would attempt to break through the outer ring of American ships which had been thrown into chaos, allowing the destroyer divisions to close and launch

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[324] Evans and Peattie, *Kaigun*, 275; Morison, *History of United States Naval Operations in World War II*, 3:21-22.
[325] Lacroix and Wells, *Japanese Cruisers of the Pacific War*, 249; Evans and Peattie, *Kaigun*, 271. Torpedo cruisers were two *Kuma*-class light cruisers, *Kitakami* and *Ōi*, which had been modified to carry a total of 40 Type 93 torpedoes in quadruple mounts.
[326] Evans and Peattie, *Kaigun*, 222; Hirama, "Japanese Naval Preparations for World War II," 66.

torpedoes against the remaining American vessels until all reloads had been expended.[327]

American observers recognised the Japanese emphasis on night action, though this had little impact on USN doctrine. Throughout the 1920s, the topic was discussed rarely. In a review of Japanese naval schools during 1927, the section dealing with torpedo training was much less detailed than the gunnery sections. The torpedo schools were included for the sake of completeness, but appear rushed, as though the naval attaché considered such issues less important.[328] The tone of American reports changed in the 1930s, as they appreciated the IJN's increased emphasis on night time torpedo attacks. A lengthy report of 1934 entirely focused on night attacks. The naval attaché noted Japan's "great emphasis" on training for such attacks, and stated that the fleet was underway at night for "considerable periods," where the light forces trained in a realistic and "most strenuous manner." The report discussed national characteristics, but as positive factors. The Japanese believed they were especially suited for conducting operations at night. "Their bravery...[and] fighting spirit combined with their careful training and ability to adhere to a well worked out plan, probably do give them confidence to carry out night attacks." A reader dismissed that conclusion and wrote a question mark beside the paragraph.[329]

As the 1930s progressed, the Americans took Japanese night fighting operations more seriously. In 1935, the naval attaché stated that "there is little doubt" Japanese light surface forces exercised night attacks far more than the USN.[330] The reports got through to Washington, where discussions of night operations received more attention than had previously been the case.

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[327] Evans and Peattie, *Kaigun*, 277-280.
[328] E-8-a 3916, "Data for Congressional Hearings: Personnel – Training and Instruction," September 15 1927, *Naval Attaché Reports, 1886-1939*, Box 728, RG 38, NA, 3-4.
[329] F-10-d 16788-F, "Night Training and Operations," October 18 1934, *Naval Attaché Reports, 1886-1939*, Box 884, RG 38, NA, 1-2.
[330] F-10-d 16788-F, "Grand Naval Maneuvers," December 13 1935, *Naval Attaché Reports, 1886-1939*, Box 884, RG 38, NA, 2.

One report of 1937 stressed Japan's heavy emphasis on night surprise attacks, and was heavily underlined.[331] The naval attaché noted Japan's realistic training during his visit to their main torpedo school. When he asked why there were no barges in the harbour from which cadets could fire practice torpedoes, as was common in the USN, the Japanese stated that live firing was conducted aboard actual destroyers at sea.[332] In his popular work, Pratt mentioned the "inescapable" conclusion that Japan intended to use aggressive torpedo attacks whenever possible.[333]

Despite this intelligence, American night battle tactics were not nearly as well developed as Japanese ones, due to the USN's emphasis on daylight battleship engagements. Although light units were trained to fight at night, their primary purpose was to support the battle line during the day. Not one interwar exercise drilled them on fighting an opposing force of light fleet units at night. Instead, they focused on finding and torpedoing the enemy battle line. Destroyer captains were told that battleships were the only worthwhile targets for their torpedoes, not light surface forces. The battleships themselves were slow and brightly illuminated during training. In combat against Japanese light surface forces, the targets moved above 30 knots and were shrouded in darkness. As a result, the USN's night torpedo tactics remained simplistic and virtually unchanged from 1920-1942.[334] A typical night action occurred during Fleet Problem XVIII in 1937, when several destroyers and cruisers attacked the opposing side's battle line. Both sides

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[331] "Annual Report of Naval Activities – Operating Year 1936," January 28 1937, *Selected Naval Attaché Reports Relating to the World Crisis, 1937-1943*, Roll 2, RG 38, NA, 1.
[332] E-8-a 1752, "Naval Torpedo School," 1.
[333] Pratt, *Sea Power and Today's War*, 167.
[334] Trent Hone, "'Give Them Hell': The US Navy's Night Combat Doctrine and the Campaign for Guadalcanal," *War in History* 13:2 (2006): 177-178.

suffered heavily despite the defending force being in a state of confusion.[335] Additionally, the Americans lacked a dedicated tactical formation, such as the Night Battle Force, and a firm doctrine for night fighting. When available forces were thrown together under Rear Admiral Daniel J. Callaghan in order to stop the planned Japanese bombardment of Henderson Field in November 1942, the formation lacked a common understanding of how to engage an enemy at night.[336]

Disastrously, the Americans projected their limited capabilities onto the Japanese. Puleston assumed that Japanese light forces were focused around the battle line, just like in the USN.[337] The disparity in training and technology between the two forces, particularly in the use of torpedoes, caused American tactics which played to Japanese strengths. In numerous engagements around Guadalcanal, American forces maintained course and speed while firing their guns, assuming Japanese torpedoes were too short range to threaten them. In reality, they were well within range of the Type 93s. Several American ships would be lost to torpedo hits throughout the campaign. The American's poor estimate of Japanese capabilities was most evident at the Battle of Savo Island in August 1942, the USN's worst defeat at sea since the War of 1812. Four Allied heavy cruisers were sunk, and two destroyers and one heavy cruiser damaged, with the loss of 1,023 killed and 709 wounded.[338]

American observers were also almost completely in the dark regarding how the IJN

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[335] Albert A. Nofi, *To Train the Fleet for War: The U.S. Navy Fleet Problems, 1923-1940* (Newport: Naval War College Press, 2010), 223.
[336] Hone, "'Give Them Hell'," 179.
[337] Puleston, *The Armed Forces of the Pacific*, 191.
[338] Hone, "'Give Them Hell'," 183; Thomas G. Mahnken, "Asymmetric Warfare at Sea: The Naval Battles off Guadalcanal, 1942-1943," *Naval War College Review* 64:1 (2011): 106; for the best single volume account of the night time naval engagements around Guadalcanal, see James D. Hornfischer, *Neptune's Inferno: The U.S. Navy at Guadalcanal* (New York: Bantam Books, 2011).

integrated air power into their fleet. Reports concerning the subject were extremely rare. Most reports about fleet aviation centred around tracking the development of flying off platforms and catapults on Japan's cruisers and battleships. Thus, in April 1927 an intelligence officer with the United States Asiatic Fleet observed a Japanese fleet anchored in Qingdao, which included several battleships. He took numerous photos from long distance and detailed which ships seemed to have aircraft on board.[339] Another report from July 1927 again noted which ships in the IJN had aircraft on board, and described the procedure for launching a plane from a flying off platform.[340] Dozens of such reports appeared in the late 1920s and early 1930s, but contradicted each other as to which ships had aircraft, revealing the perils of relying solely on distant observation.

The details of Japan's aircraft carriers themselves were estimated with reasonable accuracy. In 1927, the naval attaché listed the characteristics of all Japanese carriers then in service. His assessment of *Hōshō* was entirely correct, as was that of *Akagi* and *Kaga*, with the exception of their speed.[341] Another report noted *Hōshō's* stabiliser, which reduced the normal roll of the ship by 5º to allow for easier landings.[342] One minor technical detail with operational implications was Japan's invention of special landing lights for use on carriers. Pilots aligned these landing guidance lights in their windscreen a specific way while on approach, which provided a perfect glideslope to the deck. Since these lights were visible only from above and astern of the carrier, the Japanese could conduct flight operations at night while the carriers

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[339] A-1-b 18525, "Aviation Equipment, Foreign Naval Vessels," April 7 1927, *Naval Attaché Reports, 1886-1939*, Box 16, RG 38, NA, 1-2.
[340] A-1-b 18525, "Naval Aviation," July 27 1927, *Naval Attaché Reports, 1886-1939*, Box 16, RG 38, NA, 1-2.
[341] A-1-u 17242, "Aviation – Japanese Navy," April 2 1927, *Naval Attaché Reports, 1886-1939*, Box 142, RG 38, NA; Peattie, *Sunburst*, 227-231.
[342] A-1-b 18525, "Naval Aviation," 1.

themselves remained dark from the perspective of any surface attacker. The naval attaché discovered this small piece of technology, and reported how the system worked.[343]

One subject which remained entirely unknown was how the IJN would use its aircraft carriers tactically and operationally. The main reason for this failure was the Japanese themselves did not decide how they would use aircraft carriers until months before the start of the Pacific War. The Japanese first began to think about the creation of a carrier doctrine in 1928, when they formed *Hōshō*, *Akagi* and *Kaga* into First Carrier Division. However, officers were divided between those who saw carriers as supporting elements, and others who viewed them as offensive weapons. The Japanese lacked a doctrine or even a clear vision as to what role air power had to play in naval warfare.[344] American reports noted this confusion throughout the 1920s. In 1925, the American naval attaché stated that the organisation of the IJNAS was "unsettled."[345] On another occasion, the naval attaché asked the navy how many aircraft they intended to carry on *Akagi* and *Kaga* once they were completed. He met such confusion that he concluded the Japanese did not have a figure and were waiting until they could estimate what the Americans were going to carry on their new carriers.[346] The confusion surrounding the use of carriers was left unresolved until 1939, when the increased size of the IJNAS, along with the introduction of more powerful aircraft and aerial ordinance, prompted the Naval Staff College to draft an air operations section for the navy's battle instructions.[347] The final piece of Japan's revolutionary use of carriers did not fall into place until April 1941, when the First, Second and

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[343] Peattie, *Sunburst*, 69; A-1-a 19378, "Taking Off and Returning to Seaplane Carrier by Means of Artificial Light," July 31 1928, *Naval Attaché Reports, 1886-1939*, Box 5, RG 38, NA; A-1-a 19378, "Japanese Naval Aviation – Night Flying Equipment."
[344] Evans and Peattie, *Kaigun*, 332-333.
[345] A-1-u 17242, "Data for Congressional Hearing; Additional Detailed Information on Air Services," 1.
[346] A-1-u 17242, "Letter to Mr. McClaran," 2.
[347] Peattie, *Sunburst*, 147.

Third carrier divisions were combined into First Air Fleet. In September, Third Carrier Division was detached to provide air cover for the battleships and was replaced by the newly formed Fifth Carrier Division.[348] Therefore, the system which the Japanese would use throughout the war did not exist completely until four months before the start of the Pacific war.

The general confusion around the use of carriers was compounded by Japan's typical secrecy. The development of Japan's aircraft carriers was the most underreported subject in the interwar period. Most such reports were less than a page and typically contained details about the ships themselves. Attempts were made to ascertain Japanese progress, but little information was gathered. During the 1927 grand fleet manoeuvres, American destroyers deliberately steamed into the path of the Japanese force so to gather as much intelligence as possible. As they neared *Akagi*, its escorts intervened and laid a smokescreen to conceal flight operations.[349] Similarly, in 1934, a division of American destroyers accidentally found itself in the midst of an IJN exercise. As they moved between the light forces and the battle line they were overtaken and harassed by several warships, including the Japanese flagship. Despite these disruptions, the Americans saw two aircraft carriers operating together. The carriers' plane guard destroyers immediately laid smoke in front of their charges to block any observation, but the commander of the American destroyers steamed through the smokescreen. He observed several landings, which went "very well" and noted that these operations were carried out in poor weather "with apparent ease and safety." This report, considerably more detailed than the norm, described the actions of the

[348] Ibid., 151. On December 7, 1941, First Air Fleet consisted of the fleet carriers *Akagi* and *Kaga* (First Carrier Division), *Sōryū* and *Hiryū* (Second Carrier Division), and *Shōkaku* and *Zuikaku* (Fifth Carrier Division).
[349] Mahnken, *Uncovering Ways of War*, 75.

Japanese, and the laying of smoke in particular, as "most discourteous."[350]

More typically, in April 1940, the naval attaché wrote less than a paragraph about Japanese aircraft landing operations which had been witnessed from long distance.[351] This infrequent and vague reporting had different consequences from assessments of Japanese surface forces. A lack of information around the surface forces was filled in with the assumption that the Japanese were roughly as good as the Americans. Puleston stated, "it is apparent that a naval campaign in the western pacific would be a clash of two well-prepared navies, with ships of the same types, organized in similar formations, trained along similar lines, imbued with similar tactical ideas."[352] In contrast, the Americans did not project the capabilities of their own carrier air power onto the Japanese. Instead, they assumed the Japanese were less proficient in the use of aircraft carriers. Just before stating that the IJN was equipped and trained similarly to the USN, Puleston exempted carriers, where the Japanese would noticeably trail behind the Americans.[353]

The quality of Japan's naval personnel was a primary focus for American observers during the interwar years. The IJN had upheld a tradition of rigorous training since its founding, but the signing of the Washington Naval Treaty brought training to obsessive levels. Vice Admiral Ozawa Jisaburō, the last Commander-in-Chief of the Combined Fleet, stated that the IJN used a formula where fighting strength equalled the multiplication of mechanical strength, mental strength and training. Since the treaties limited mechanical strength, Japan turned to

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[350] F-10-e 22222, "Weekly Intelligence Summary – week ending 21 April, 1934," April 21 1934, *Naval Attaché Reports, 1886-1939*, Box 901, RG 38, NA, 1-3.
[351] "Landing Intervals on Japanese Aircraft Carriers," April 6 1940, *Naval Attaché Records, 1939-1941*, 1940 File 1-58, RG 38, NA.
[352] Puleston, *The Armed Forces of the Pacific*, 232.
[353] Ibid., 227.

training and fighting spirit to overcome their material disadvantage.[354] The IJN imposed a strict seven-day work week on its personnel, and even created slogans such as "Monday, Monday, Tuesday, Wednesday, Thursday, Friday, Friday." Naval manoeuvres "were arduous in the extreme." Losses of Japanese ships and sailors were not uncommon.[355]

American intelligence assessments of Japanese naval personnel remained consistent and mostly assumed competence throughout the interwar period. In May 1920, the British naval attaché in Tokyo penned a glowing assessment which claimed the IJN was "second best in the world; it ranks next to the British Navy." The American naval attaché passed this information on, though bothered that his British counterpart had snubbed the USN.[356] Japan's emphasis on intense training was identified by American observers, who frequently visited Japanese gunnery schools. One summary of gunnery schools in 1921 noted that the IJN trained in "almost the same" way as the USN. They conducted gunnery training at sea under circumstances as close as possible to actual combat conditions. However, the Japanese kept the results, opinions and regulations secret, and therefore the exact quality of their gunnery was unknown. The reader highlighted the sentences which discussed Japan's similarity to American training methods, revealing some ethnocentrism.[357] This report was typical: short on details, ethnocentric, but not overly negative.

Numerous reports noted the time devoted to shore-based training within the IJN. One

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[354] Jisaburo Ozawa, "Development of the Japanese Navy's Operational Concept against America," in *The Pacific War Papers: Japanese Documents of World War II*, ed. Donald M. Goldstein and Katherine V. Dillon (Washington, D.C.: Potomac Books, 2004), 74.
[355] Hirama, "Japanese Naval Preparations for World War II," 66.
[356] U-1-l 11623, "Statement of British Naval Attaché Regarding Japanese Navy," May 14 1920, *Naval Attaché Reports, 1886-1939*, Box 1278, RG 38, NA.
[357] E-8-a 1753, "Summary of Gunnery Training in the Japanese Navy," February 8 1921, *Naval Attaché Reports, 1886-1939*, Box 726, RG 38, NA.

report referred to the level of education among Japanese naval officers as "unique and astonishing," with "the highest form of selection, so far developed, by any navy in the world."[358] The efficiency and centralisation of Japanese instruction received constant praise. It provided more thorough and uniform training of personnel than was present within the USN.[359] A summary of IJN personnel emphasised this point heavily. The policy of instruction required all junior line officers to take ordinary courses, all gunnery officers to take higher level courses and all enlisted men in gunnery ratings through gunnery courses, before being assigned to a warship. The word "all" was underlined by the reader wherever it appeared. The summary concluded that this thoroughness of classroom instruction was typical of the Japanese and "undoubtedly" contributed toward their standardised gunnery methods throughout the fleet.[360] So too, in a visit to a Japanese gunnery school during 1936, the naval attaché noted that the IJN's main advantage was the centralisation of training, producing more consistent and rigorous instruction than could be accomplished by similar training carried aboard ship by individual officers. While the actual skill of Japanese gunnery officers was unknown, the quality of their instruction indicated that "they are good."[361]

Despite the constant praise of Japanese classroom instruction, many reports noted a lack of ocean-going experience among officers. One particularly negative report from 1922 provided a detailed mathematical breakdown of the practical experience of Japan's pool of officers,

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[358] E-8-a 15191, "Monograph Report, Training of Officers," January 9 1922, *Naval Attaché Reports, 1886-1939*, Box 732, RG 38, NA, 1.
[359] E-8-a 1753, "Visit to Gunnery School and Torpedo School," February 24 1926, *Naval Attaché Reports, 1886-1939*, Box 726, RG 38, NA, 4.
[360] E-8-a 3916, "Data for Congressional Hearings: Personnel – Training and Instruction," 3.
[361] E-8-a 1753, "Visit to Gunnery School," August 5 1936, *Naval Attaché Reports, 1886-1939*, Box 726, RG 38, NA, 2.

concluding that the IJN was "greatly over-rated."[362] A more balanced report from 1929 concluded that while the IJN devoted more time and money proportionally to training than the USN, it sacrificed practical ocean-going experience in favour of theoretical learning.[363] This criticism, while conceptually valid, was rarely supported with much evidence. Americans never attended Japanese exercises, while classroom training remained open for observation. This may have caused an assumption that the massive amount of theoretical training could not possibly have been backed up by significant amounts of practical training. However, the Americans did receive evidence which indicated that the Japanese trained hard at sea. The naval attaché in Tokyo noted any time a Japanese vessel was damaged or sunk when on exercise. Every time this occurred, he concluded that the Japanese must have been simulating actual combat conditions during training. Once, the naval attaché even outlined the IJN's belief in their superior fighting spirit and training in order to overcome their numerical disadvantage. Many of these reports were underlined by a reader, indicating that it was a topic of interest in Washington.[364]

Specifics regarding the proficiency of Japanese personnel were rare. From radio intercepts gathered by an American cruiser during the IJN's 1927 manoeuvres, the Americans noted that Japan's usage of radio was comparable to where the USN had been years before, "when the supervision and control of operators was still out of hand."[365] A few opportunities to observe Japanese gun drills also occurred. In February 1928, the naval attaché was invited

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[362] E-8-a 6746, "Study, Analysis, and Estimate of Japanese Naval Personnel and of the Japanese Navy as a Fighting Organisation," February 27 1922, *Naval Attaché Reports, 1886-1939*, Box 730, RG 38, NA.
[363] E-8-a 3916, "Personnel: Training," May 15 1929, *Naval Attaché Reports, 1886-1939*, Box 728, RG 38, NA, 4-5.
[364] F-10-d 20285, "Submarine I-4 damaged while engaged in maneuvers," June 28 1932, *Naval Attaché Reports, 1886-1939*, Box 887, RG 38, NA; "Sinking of Submarine I-63," February 15 1939, *Naval Attaché Records, 1939-1941*, 1939 File 1-87, RG 38, NA.
[365] "The ORANGE Maneuvers and Analysis of Information Obtained," in *Listening to the Enemy: Key Documents on the Role of Communications Intelligence in the War with Japan*, ed. Ronald H. Spector (Wilmington: Scholarly Resources, 1988), 18.

aboard *Isuzu*, a *Nagara*-class light cruiser, to witness a crew fire one 5.5" gun. He noted the lack of director equipment, among other technical characteristics of the weapon, and learned that short range practice had been discontinued. Instead, gunnery training was conducted at an average range of 9km. The loading drill was described as "by the numbers." The procedure was fast, but several seconds were lost by men clicking their heels together between every action. The Japanese crew yelled constantly, very different from the silent teamwork of American gun crews. The naval attaché thought this indicated a "rigidity" that would cause problems if casualties were sustained.[366]

In 1937, the Japanese let the American naval attaché observe general quarters aboard *Kuri*, a very old *Momi*-class destroyer. The report included another detailed description of the Japanese procedure for firing a gun, which was nearly identical to that witnessed ten years before, but the conclusion was different. The current naval attaché thought that discipline "seemed nearly perfect. They performed each function like automatons." He also witnessed several casualty situations, where each crewman conducted the job of the "dead" crewmen perfectly. Overall, the drill was carried out "with precision and smartness. The discipline and morale appeared to be excellent."[367] This report invalidated the criticism from the older report concerning the "rigidity" of Japanese procedure, and revealed the perils of relying on infrequent, one-off observations. Extrapolations from such observations could be flawed, but seem credible due to a lack of contrast.

National characteristics permeated the reporting on Japanese naval personnel. A report on

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[366] E-8-a 1753, "Visit to Gunnery School, Yokosuka," February 24 1928, *Naval Attaché Reports, 1886-1939*, Box 726, RG 38, NA, 2-3.
[367] E-7-c 11974, "Notes on Japanese Navy," June 1 1937, *Naval Attaché Reports, 1886-1939*, Box 723, RG 38, NA, 1-3.

Japanese naval officers from 1920 provided an extensive list of stereotypes which shaped the opinions of later American observers. Japanese personnel lacked initiative and had "a strong natural tendency to routine." "The Japanese originate practically nothing. They are almost entirely lacking in the inventive faculty. Even as copyists they almost invariably produce a distinctly inferior article." These scathing accusations of unoriginality were not limited to the technological, but the doctrinal and tactical as well.[368] In a report on Japanese personnel from 1922, the phrase which was underlined stated that the Japanese had an "almost universal lack of initiative."[369]

This trend continued in 1927 with a summary of Japanese personnel provided for the United States congress. It openly stated that "certain basic traits of character of the Japanese as a race" had to be considered, since they shaped the IJN's effectiveness. The summary argued that IJN officers possessed "racial characteristics" that prevented them from being able to make up their minds quickly or to assume individual responsibility. Japanese personnel were "inferior in basic intelligence, education, and initiative as compared to our men."[370] In 1934, a negative report on the ship handling of Japanese officers at sea explained their supposedly poor station keeping by proposing that "the Japanese do not learn by experience as quickly as American or British officers." This statement was underlined by the reader.[371] Puleston believed that Japanese enlisted personnel were slower mentally and less capable of reacting to an unexpected

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[368] E-8-a 10588, "Notes on Japanese Naval Officers," August 19 1920, *Naval Attaché Reports, 1886-1939*, Box 730, RG 38, NA, 1-2.
[369] E-8-a 6746, "Study, Analysis, and Estimate of Japanese Naval Personnel and of the Japanese Navy as a Fighting Organisation," 5.
[370] E-8-a 6746, "Data for Congressional Hearings: Personnel," September 9 1927, *Naval Attaché Reports, 1886-1939*, Box 730, RG 38, NA, 1-2.
[371] E-8-a 6746, "Ship Handling by Japanese Naval Officers," October 19 1934, *Naval Attaché Reports, 1886-1939*, Box 730, RG 38, NA.

situation.[372] The lessons drawn from such observations were reiterated in numerous reports, and consisted mainly of adopting a policy which prevented the Japanese from observing any western technology or tactics, so that they could not learn anything new.[373] The implication was that the Japanese could not develop any new technology, tactic or training method that was not somehow derived or directly copied from a western source.

Evidence of Japanese lack of initiative often took on a farcical nature. The American naval attaché's observation of the 1936 grand naval review was positive overall, and concluded that the fleet was "well handled and formidable." However, he noted that the manoeuvres were scripted, something typical of a naval review, and that everything had gone "as planned." These last two words were underlined, as if the reader viewed this comment as confirmation of the Japanese people's lack of originality or flexibility. The naval attaché concluded by extrapolating without evidence that "any last minute change would have been too upsetting to the methodical but unimaginative Japanese mind."[374]

The impact of concepts of national characteristics and ethnocentrism was not always negative. In 1927, a summary of Japanese personnel claimed that the IJN was the most "efficient organisation" that existed in Japan, because it had adopted and developed more "western ideas and methods" than any other body.[375] A translation in 1935 of a French article endlessly praised Japanese naval officers, while criticising the Americans and British, without containing anything concrete. Instead, it was based solely on the national characteristics of these three countries. The naval attaché added that it was "interesting to note the different impressions made" by the

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[372] Puleston, *The Armed Forces of the Pacific*, 175.
[373] E-8-a 1753, "Visit to Gunnery School, Yokosuka," 4.
[374] F-10-d 20618-C, "Special Grand Naval Review," 2-3.
[375] E-8-a 6746, "Data for Congressional Hearings: Personnel," 1.

Japanese.[376] The overall American impression was that Japanese personnel would be capable and well trained, but lacking in initiative. This made it easy to assess their capabilities within the framework of mirror imaging, since Japanese naval personnel were expected to operate identically to Americans or, more likely, follow inferior copies of western practices.

Despite a lack of information surrounding the capabilities of the IJN's personnel, tactics and technology, the Americans understood the basics of Japan's naval strategy. The term "strategy" is a misnomer, as the IJN spent the entire interwar period preparing a single operational plan that would produce a climatic decisive battle with the American fleet somewhere in the Pacific. After the Washington Naval Treaty was signed, the IJN switched from an interception strategy based purely on capital ships, to one which emphasised attrition through the use of light fleet units, after which the battleships would smash what remained of the American fleet.[377] This strategy remained in place from 1923-1941 with few revisions, most important being the shift in location of the decisive battle. In 1940, the IJN settled on a decisive battle occurring around the Bonin and Mariana Islands.[378]

The broad outline of Japan's interception-attrition strategy was known to the Americans because the Japanese discussed it openly. The IJN constantly played out an American naval advance across the Pacific and the Japanese press openly published summaries of the annual manoeuvres. While direct American observation was prohibited, the press releases provided a

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[376] U-1-l 11623, "The Japanese Naval Officer," February 1 1935, *Naval Attaché Reports, 1886-1939*, Box 1278, RG 38, NA, 1.
[377] Hirama, "Japanese Naval Preparations for World War II," 66.
[378] Evans and Peattie, *Kaigun*, 465.

surprisingly detailed look at how the IJN planned to fight the United States.[379] Naval commentators openly discussed the IJN's planning. One commentator detailed the central role of submarines in attrition operations.[380] Despite their knowledge of Japan's operational plans, the overriding factors which influenced the USN's war planning were grand strategic, such as the prospect of fighting a two-ocean war, and the logistics of moving the fleet across the vast expanse of the Pacific given the non-fortification clause of the Washington Naval Treaty. Similarly, the construction of the American fleet was influenced more by the non-fortification clause than by what the Japanese were doing, or thought to be planning.[381]

Due to American planners' emphasis on grand strategic and logistical factors, the most important intelligence assessments were focused on Japan's economic and industrial strength. Japan lacked the resources needed to construct, maintain and fuel its fleet in a war against the United States. Japan was fully aware of this weakness, and its quest for autarky ultimately drove it into a war with the western powers. The IJN itself was bribed into agreeing to go to war against the United States, with the promise of increased resource allocations for its construction programs.[382] American intelligence understood these matters as well. Their assessments were fixated on Japan's lack of raw materials. A report of December 1919 detailed Japan's poor production of steel and pig iron. The cost of producing such materials in Japan was significantly

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[379] F-10-d 16788, "Japanese Grand Maneuvers," October 25 1924, *Naval Attaché Reports, 1886-1939*, Box 884, RG 38, NA; F-10-d 16788-A, "Japanese Naval Maneuvers October 8-15, 1926," November 4 1926, *Naval Attaché Reports, 1886-1939*, Box 884, RG 38, NA; F-10-d 16788-F, "Grand Naval Maneuvers."
[380] F-10-d 20494, "Forwarding Publication 'Japanese Submarines' by T. Ikezaki," 12.
[381] For more on the USN's war plans against Japan, see Edward S. Miller, *War Plan Orange: The U.S. Strategy to Defeat Japan, 1897-1945* (Annapolis: Naval Institute Press, 1991); for more on the impact of the non-fortification clause on American ship design, see John T. Kuehn, *Agents of Innovation: The General Board and the Design of the Fleet that Defeated the Japanese Navy* (Annapolis: Naval Institute Press, 2008).
[382] For more on Japan's economic weakness, and how that weakness drove its militarism, see Michael A. Barnhart, *Japan Prepares for Total War: The Search for Economic Security, 1919-1941* (Ithaca: Cornell University Press, 1987).

greater than in the United States.[383] Another report noted a steady decrease in Japan's mineral production of 1919-1920.[384] Such reports continued throughout the interwar period, and constantly detailed Japan's various "shortages," "problems," and crises concerning the resources available to power its economy.[385] These assessments were considerably more detailed and accurate than anything concerning the tactics and technology of the IJN.

Most of the resources available to Japan had to be imported from abroad, something noted by both classified and open sources.[386] Oil was Japan's most acute shortage, and the one which American observers most heavily assessed. Hundreds of reports discussed Japan's oil problems at length. A report of 1927 tallied all the oil resources available to Japan, along with the estimated consumption rates of the IJN, and concluded that it did not have anywhere near enough oil for a protracted war against the United States.[387] The Japanese made efforts to find alternatives, such as the liquefaction of coal, but the oil shortage was so dramatic that the deficit was insurmountable.[388] Instead, Japan was forced to rely on American imports, which made up 80-90% of its oil supply.[389] This problem was openly discussed by the Japanese. American observers were able to track what Japan was doing to combat the shortage. Thus, in 1937, the naval attaché sent back a translation of a lecture given by an IJN engineering officer. The latter

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[383] K-11-a 5933-A, "Probable Crisis of the Iron Industry," December 31 1919, *Naval Attaché Reports, 1886-1939*, Box 1034, RG 38, NA, 1.
[384] K-11-a 5933-A, "Japan's Mineral Output," March 18 1920, *Naval Attaché Reports, 1886-1939*, Box 1034, RG 38, NA.
[385] "Iron and Steel Shortage in Japan," April 30 1937, *Selected Naval Attaché Reports Relating to the World Crisis, 1937-1943*, Roll 2, RG 38, NA; "Production of Coal in Japan," September 26 1939, *Naval Attaché Records, 1939-1941*, 1939 File 165-233, RG 38, NA; "Problems of the Japanese Chemical Industry," December 7 1939, *Naval Attaché Records, 1939-1941*, 1939 File 234-281, RG 38, NA.
[386] Puleston, *The Armed Forces of the Pacific*, 18.
[387] E-10-d 13177-C, "Oil," May 25 1927, *Naval Attaché Reports, 1886-1939*, Box 769, RG 38, NA, 2.
[388] E-10-d 13177-C, "Liquifaction (sic) of Coal: Steps taken to overcome Japan's oil shortage," August 20 1935, *Naval Attaché Reports, 1886-1939*, Box 769, RG 38, NA; E-10-d 13177-C, "Oil Situation," August 20 1935, *Naval Attaché Reports, 1886-1939*, Box 769, RG 38, NA.
[389] Evans and Peattie, *Kaigun*, 408.

elaborated on the IJN's fuel policy, including the storage of fuel, acquisition and development of oil resources and increased production of artificial oil. He concluded that "today's fuel problem is truly a serious one both from the standpoint of national defense, and industry."[390] Discussions within the diet also illuminated Japan's policy regarding oil.[391]

These oil shortages harmed the IJN both before and during the Pacific War. The Americans noted any time Japanese naval manoeuvres were restricted due to fuel oil shortages, as in 1926.[392] The oil problem became more apparent after the start of the war in China. The naval attaché immediately noted a sharp decrease in the number of days which the main units of the IJN spent underway.[393] In 1939, the naval attaché claimed that due to the need to maintain its stockpiles, the IJN had done little cruising and reduced its gunnery practice at sea. Instead, drilling at anchor had become more frequent and intense.[394] None the less, not being able to exercise at sea regularly would endanger the fighting capabilities of any navy.

The impact also was felt during the war. Admiral Yamamoto Isoroku's request that *Yamato* be sent to Guadalcanal so to break the back of the embattled Americans was denied by the NGS, due to the fuel required to move the 64,000 ton monstrosity.[395] Had Yamamoto bombarded Henderson Field on Guadalcanal with a powerful surface force centred on the *Yamato*-class battleships, it would have burned approximately 5.1% of the IJN's monthly

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[390] E-10-d 13177-C, "The Fuel Oil Question as Viewed by the Navy," October 7 1937, *Naval Attaché Reports, 1886-1939*, Box 769, RG 38, NA, 2-3.
[391] "The Fuel question at Present as Reflected by Interpellations in the Diet," February 14 1939, *Naval Attaché Records, 1939-1941*, 1939 File 1-87, RG 38, NA; "Japan's Oil Problem - Diet," March 13 1939, *Naval Attaché Records, 1939-1941*, 1939 File 1-87, RG 38, NA.
[392] F-10-d 16788-A, "Japanese Naval Maneuvers October 8-15, 1926," 4.
[393] "Annual Report of Naval Activities – Operating Year 1936," 1.
[394] "Operating Schedule of the Japanese Combined Fleet," June 20 1939, *Naval Attaché Records, 1939-1941*, 1939 File 89-164, RG 38, NA.
[395] Hiroyuki Agawa, *The Reluctant Admiral: Yamamoto and the Imperial Japanese Navy*, trans. John Bester (New York: Kodansha America, 2000), 328-329.

allowance of fuel oil. In order to prevent repairs, sustained bombardments against Henderson likely would have been required night after night. Such operations were impossible given Japan's fragile oil situation.[396] Due to a severe shortage of refined fuel, by June 1944 the IJN was burning oil taken straight from wells on Borneo, although crude oil was less stable and more prone to fire than fuel oil, and contained impurities that damaged the boilers of ships.[397] The new aircraft carrier *Taihō*, Ozawa's flagship at the Battle of the Philippine Sea, was sunk by a single torpedo hit when, due to improper damage control, dangerous fumes from its unrefined fuel spread throughout the ship causing a massive explosion.[398] American observers had predicted such issues years before.

The industrial weakness of Japan also was a constant theme of American reports. Japan lacked the warship building capacity to compete with the USN in a protracted war. H.P. Willmott notes that American industrial dominance over Japan was such that, had the IJN sunk every major unit in the entire USN at the outset of the war, while losing no vessels itself and completing its own impossibly ambitious programs, the Americans would still have possessed a larger fleet by mid 1944.[399] From 1942-1945, the United States dramatically out-produced Japan in every category of vessel.[400] Parshall and Tully note that regardless of the outcome of the Battle of Midway, viewed by many as a turning point of the Pacific War, "the very best the

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[396] Jonathan Parshall, "Oil and Japanese Strategy in the Solomons: A Postulate," in *Imperial Japanese Navy Page*, http://www.combinedfleet.com/guadoil1.htm (accessed 22 November 2015). The hypothetical bombardment force used in the fuel consumption calculations consists of *Yamato*, *Musashi*, a heavy cruiser division (four *Myōkō*-class), a *Nagara*-class light cruiser and nine destroyers. The famous "Tokyo Express" was also extremely inefficient due to the high rate at which destroyers consumed fuel. Approximately 1.5 tons of fuel oil were consumed for every man or barrel of supplies sent to Guadalcanal by destroyer.
[397] Paul S. Dull, *A Battle History of the Imperial Japanese Navy, 1941-1945* (Annapolis: Naval Institute Press, 2007), 303.
[398] Ibid., 308.
[399] H.P. Willmott, *The Barrier and the Javelin: Japanese and Allied Pacific Strategies, February to June 1942* (Annapolis: Naval Institute Press, 2008), 522.
[400] Evans and Peattie, *Kaigun*, 367.

Japanese could have hoped for by the end of 1943 was the ability to offer battle on terms that were merely disadvantageous, rather than utterly ruinous."[401] No amount of territory that Japan captured in the Pacific could solve its industrial weakness. It could not prevent the completion of the USN's programs, or help the IJN build its own vessels faster.[402] As long as the United States had the will to fight the war, it would win.

The Americans had known this fact for years. Puleston stated that even if the Japanese gained the upper hand in a war initially, "the continental position of the United States with its outlying insular bulwarks is invulnerable to any Japanese attack, sooner or later the American navy would return in full force to the Pacific."[403] American observers constantly tracked the shipbuilding capacity of Japan through open and classified sources.[404] Monthly reports were extremely detailed. They discussed everything from Japanese orders for new tonnage, ship launchings, salvaging, shipping policy, shipping companies and the condition of the shipping itself.[405] Through much collaboration between the American commercial attaché and the naval attaché, the industrial expansion of Japan was closely followed.[406] General summaries on Japan's economy, by far the most detailed reports sent out of the naval attaché's office in Tokyo, were sent annually.[407] In 1939, a summary of Japanese finance, industry and commerce discussed the

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[401] Parshall and Tully, *Shattered Sword*, 424.
[402] Ibid., 427.
[403] Puleston, *The Armed Forces of the Pacific*, 260.
[404] "Shipbuilding Capacity - Japan," February 15 1937, *Selected Naval Attaché Reports Relating to the World Crisis, 1937-1943*, Roll 2, RG 38, NA; "Merchant Marine Notes," October 10 1939, *Naval Attaché Records, 1939-1941*, 1939 File 165-233, RG 38, NA.
[405] "Shipping in the Japanese Empire During August 1939 As Reported by the American Consulate, Kobe, September 22nd.," September 25 1939, *Naval Attaché Records, 1939-1941*, 1939 File 165-233, RG 38, NA.
[406] "Manufacturing Production in 1936," January 18 1937, *Selected Naval Attaché Reports Relating to the World Crisis, 1937-1943*, Roll 2, RG 38, NA; "Industrial Expansion," April 20 1937, *Selected Naval Attaché Reports Relating to the World Crisis, 1937-1943*, Roll 2, RG 38, NA.
[407] "General Intelligence Summary – Economic: Annual Economic Review of Japan, 1939," February 18 1940, *Naval Attaché Records, 1939-1941*, 1940 File 1-58, RG 38, NA.

impact of the war in China. It noted Japan's heavy reliance on imports from the United States, from oil, to scrap metal, to machine tools. This analysis was check marked by the reader. A "shortage of labor" was underlined, and a discussion of such shortages being even more acute in the Japanese puppet states of Manchukuo and Mengjiang was check marked. 45% of Japanese imports came from the United States, and 30% of Japanese exports were sent back across the Pacific. This observation received yet another check mark from the reader.[408] Pratt summarised the accurate American views when he stated that Japan "is as much a poorhouse as Italy in the essential raw materials of mechanical war."[409] This knowledge was used to good effect by the Americans both before and during the war, and led to the utter ruination of Japan's war making potential.[410]

American intelligence assessments of Japanese naval power from 1920-1941 were consistently mediocre. A main cause was Japanese secrecy. The Japanese were open during the early part of the interwar period, but increased security after their withdrawal from the Washington Treaty System. The Japanese also routinely used deception and lying to hide the capabilities of their naval forces. This forced a reliance on open sources for intelligence gathering, which were useful where strategic and economic issues were concerned, but mostly useless for determining the IJN's technology and tactics. Despite these limits and the effect of mirror imaging, the USN accurately assessed the Japanese battle line, with the one notable exception of the *Yamato*-class. However, Japanese light surface forces, night time tactics and the

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[408] "General Intelligence Summary – Part III Finance, Industry and Commerce," September 12 1939, *Naval Attaché Records, 1939-1941*, 1939 File 165-233, RG 38, NA, 1-3.
[409] Pratt, *Sea Power and Today's War*, 160.
[410] For more on the United States' systematic destruction of Japan's economy, see Edward S. Miller, *Bankrupting the Enemy: The U.S. Financial Siege of Japan before Pearl Harbor* (Annapolis: Naval Institute Press, 2007); Clay Blair Jr., *Silent Victory: The U.S. Submarine War against Japan* (Annapolis: Naval Institute Press, 2001).

usage of torpedoes were all badly underestimated or misunderstood by American observers. Not coincidentally, these were areas where the Japanese differed from American practices, and had developed original technology and tactics, rendering mirror imaging useless at best and disastrous at worst. Accurate reports discussing Japanese technological advances were often dismissed due to a belief that the Japanese could not surpass the Americans in innovation. One vital issue, how the Japanese were using aircraft carriers, was almost entirely unknown. Instead of projecting their own capabilities onto the Japanese in this area, however, the Americans assumed the Japanese were far worse.

American views of Japanese naval personnel were middling due to the impact of ethnocentrism and ideas of national characteristics. Assessments based from direct observation tended to praise the IJN's rigorous training, as well as the discipline of its personnel. However, other reports emphasised the perceived lack of initiative and, sometimes, the inherent inferiority of Japanese personnel compared to their western counterparts. These assumptions bled back into direct observations, where even the slightest indication of their presence was emphasised, and often underlined by the reader. None the less, assessments of Japanese naval personnel were never entirely dismissive. The overall impression was that the IJN would be a competent, if unremarkable, opponent.

The Americans accurately tracked Japanese naval strategy, as well as its ability to wage a protracted and industrialised war at sea. The Japanese openly discussed the basic tenets of their naval strategy, designed their ships around its principles and continuously trained their forces to execute their planned interception-attrition operation. This allowed the Americans to easily track the development of the IJN's strategy. Japan's extreme economic weakness was also apparent to any American observer. Japan lacked the raw materials, labour force and production capabilities

required to fight the United States over the long term. The Americans planned around these correct estimates of Japan's war making ability and eventually overcame the IJN from 1941-1945, exacting a level of attrition that was impossible for the Japanese to sustain. While mistakes made in assessing the IJN's technology and tactics contributed to several early American defeats, the remarkable accuracy of high level assessments ultimately enabled the USN to win the war.

CHAPTER 6: CONCLUSION

American assessments of Japanese air and naval power during the interwar period were a mixed bag. Rather than completely failing to understand the dangers posed by the Japanese air services and the IJN, because of racism, as Dower and others have argued, Americans gauged their opponents through observation, and by the same means used to assess western military forces. Racism had little influence on these assessments. Ethnocentrism marked the *language* of many reports, even when good sources of information were available, but rarely *shaped* the conclusions. The distinction between these matters often is overlooked, leading to simplistic explanations for the shortcomings of American assessments. Many accurate conclusions were coined in ethnocentric, or even racist, terms. While this language may be unpalatable to our modern sensibilities, still these assessments often were accurate. When ethnocentrism or ideas of national characteristics shaped conclusions, it almost always stemmed from the broader issue of Japanese secrecy, rather than being the root cause of miscalculations. The more secretive the Japanese became, the less information was available to Americans who, in turn, relied on ethnocentrism, ideas of national characteristics, preconceived notions and mirror imaging, to fill the gaps in their knowledge. This matter was best seen in assessments of Japanese air power from the 1920s, which were highly accurate at all levels. Had ethnocentrism and racism been the decisive factors, the reports from 1922 should have been just as flawed as those from 1938. Instead, the quality of air power assessments fell sharply from 1920-1940, which was linked to the increase in Japanese information security.

Japanese secrecy was most effective at concealing advances in tactics and technology. It was not coincidental, therefore, that American assessments addressing these low level issues

were the least accurate overall. The interwar period was a time of immense technological and tactical change, particularly where air power was involved. While Japan remained open for foreign observers, and their air services depended on foreign assistance, the assessments of low level capabilities of Japanese air power were excellent. Only when the Japanese air services moved from their foreign dependence while increasing their information security, did errors in assessment emerge on a large scale. American observers began to rely increasingly on the preconception that the Japanese could not innovate in the realm of air power, which had been correct throughout the 1920s and early 1930s, but was no longer so by the late 1930s. Japanese secrecy prevented the Americans from obtaining enough information to break that paradigm, though attitudes changed immediately at the outset of the war, unfortunately, too late. The crucial period of the mid 1930s, when the Japanese air services made their transition from the rigid copying of foreign designs to the development of indigenous aircraft, saw American observers stuck in their ways, refusing to acknowledge Japanese advances. The little information which indicated a dangerous increase in the capabilities of Japan's air services was easily dismissed, among the hundreds of reports that claimed Japan could not innovate technologically or tactically. As a result, a lack of information caused by Japanese secrecy led American observers into a cycle of confirmation bias.

During the interwar period, the IJN was never as open to western observation as the air services, nor as dependent on foreign assistance. Therefore, American assessments of Japan's naval technology and tactics were consistently mediocre, mirroring their level of access. The lack of information led to a reliance on mirror imaging, allowing the Americans to accurately assess certain aspects of the IJN, while badly misconstruing others. Where Japanese air power was assumed to be inferior technologically and tactically, the opinion of the IJN remained

higher. American mirror imaging assumed that the IJN would be roughly as good as the USN in all areas except naval aviation, and would operate in similar ways. Unsurprisingly, the most accurate American assessments of Japanese tactics and technology centered on the areas where the IJN and USN shared the most similarities, such as the use of battleships. Areas where the two navies diverged in practice, like night fighting and the use of torpedoes, were grossly misrepresented in American reporting. As with air power, the root cause which prevented the Americans from understanding the IJN's tactics and technology was not ethnocentrism, preconceptions or mirror imaging, but a lack of information.

Assessments of Japanese personnel also were closely linked with American opportunities to observe their training and conduct. These reports were the most heavily influenced by ethnocentrism, ideas of national characteristics and, in rare cases, explicit racism. Even so, reports tended to stick to facts, as long as the Americans had them. Negative conclusions concerning the personnel of the Japanese air services from the 1920s were based on direct observation and extensive experience working with Japanese pilots, ground crew, factory workers and engineers. However, as the Americans lost the ability to observe Japanese aviation personnel in the mid and late 1930s, the quality of assessments plummeted. Only after direct observation was denied by the Japanese did American assessments begin to rely on ethnocentrism and ideas of national characteristics. Despite this problem, many reports still tried to base their conclusions on observations from the 1920s, when Japan's military aviation was struggling, rather than solely on stereotypes of the Japanese. The main flaw of such reports was a reliance on dated observations rather than ethnocentrism and ideas of national characteristics. The latter issues made it easier for American observers to accept dated and negative information regarding Japanese aviation personnel, but still they did not cause these miscalculations.

Japanese naval personnel generally were viewed as competent, despite ethnocentrism and stereotypes emerging in reporting more often than with the IJNAS and IJAAS. The middling views of IJN personnel mirrored the level of access given to American observers. The one national characteristic which continuously emerged was the assumption about Japanese lack of initiative. Unlike other examples of national characteristics, the belief in Japan's lack of initiative informed many reports about IJN personnel. Even when direct observation was possible, ethnocentrism was part of the conceptual lens through which many observers viewed IJN seaman and officers. American observers constantly reiterated that Japanese naval personnel would lack initiative in the field, their tactics and doctrine would be predictable and their engineers would prove incapable of developing original advanced designs. Even the smallest piece of circumstantial evidence, like a naval review going according to plan, was used to uphold the assumption that the IJN lacked initiative.

American assessments of strategic and industrial issues remained consistently excellent throughout the interwar period. American observers accurately tracked advances in Japanese industry, regardless of attempts to tighten information security. Ethnocentrism and ideas of national characteristics did not distort this reporting, as the Americans could draw upon plenty of available sources of accurate information. The primary focus of reporting was the threat Japan posed in a future war, which the Americans assumed would be a long war of attrition. Therefore, the extra attention to, and harsh criticism leveled against, Japan's weak industrial capabilities, lack of aircraft reserves, skilled labour, pilots, seaman, officers and raw materials, was more important to American appreciations than determining the technical characteristics of a given aircraft or naval vessel. Japan lacked the resources required to win a prolonged war of attrition against the United States. Many of the insurmountable problems Japan faced during the Pacific

War, such as a lack of pilots and aircraft, were predicted by American observers. The Americans assessed their possible enemy in comparison with an accurate appreciation of their own capabilities. Japan failed to pass the challenge. The quality of an individual piece of technology, or the success of a specific tactic, was irrelevant over the long term if the system they operated within was weak. American observers did not miss the forest for the trees. In the end, Japan was ground to dust by an adversary which was, to many Japanese decision makers, incomprehensibly wealthy, populous, industrious, rich in natural resources and determined.

Christopher Bell states that "British naval intelligence [regarding the Japanese] is often presented as a matter of incompetence leading to disaster, but it is better seen as a case of mediocrity leading nowhere at all."[411] A similar statement could be made of American assessment of Japanese air and naval power. Even had the Americans perfectly assessed the tactical and technological capabilities of the IJN and Japanese air services, the numerical and materiel shortages of the forces in East Asia and the western Pacific during 1941, combined with surprise, made it nearly impossible for them to stop the initial Japanese attack. Nor did mistakes in these assessments cause those material weaknesses.

The impact of American intelligence assessments about Japanese air and naval power in the opening months of the war was of tertiary importance. Despite numerous mistakes in assessing the tactical and technological capabilities of the IJN and Japanese air services, the string of early Allied defeats stemmed primarily from the failure to discover the intentions of Japan's leaders. It is here, rather than with capabilities, that American and British assessments were most crucial, and ethnocentrism and ideas of national characteristics most costly. Tactical

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[411] Bell, "The Royal Navy, War Planning, and Intelligence Assessments of Japan, 1921-1941," 155.

surprise enabled Japan to land its forces in Malaya, hit the airfields in the Philippines and wreck the Pacific Fleet in Pearl Harbor. The example of Pearl Harbor, the most famous of these cases, clearly illustrates how tactical surprise, not errors in the assessment of the IJN and IJNAS, enabled Japan to accomplish its operational objectives. American admirals, generals and politicians understood that an attack by Japanese aircraft carriers against Hawaii was possible, and ordered the garrison to prepare to receive one. Despite this, numerous examples of unpreparedness littered the defences at Pearl Harbor. The United States Army, the branch of the American forces charged with the protection of the fleet in port, was caught totally unprepared. Army AA guns and aviation were in complete stand down. Aircraft were lined up in rows on airfields in order to make them easier to guard against possible attacks by fifth columnists. The USN was little better prepared, with only one-fourth of heavy AA guns manned on the battleships and very little ready service ammunition available. 50% of the officers on some ships were absent on December 7. Many of the junior and senior petty officers on liberty would have been needed to man the gun and AA battery directors in the event of an attack. Alan Zimm convincingly argues that even a 40-minute warning would have proven near-crippling to the Japanese attack, and significantly mitigated the damage done to the Pacific Fleet.[412] A completely accurate assessment of the aircraft and tactics of the IJNAS would have done little to ease the blow sustained by the American Pacific Fleet, as it slept at anchor on the morning of December 7, 1941.

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[412] For the best work concerning the planning, preparation and intelligence around the attack on Pearl Harbor, see Gordon W. Prange et.al., *At Dawn we Slept: The Untold Story of Pearl Harbor* (New York: Penguin Group, 1991); Alan D. Zimm, *Attack on Pearl Harbor: Strategy, Combat, Myths, Deceptions* (Havertown: Casemate Publishers, 2011), 267-288.

The British were similarly surprised as to where and when the Japanese would strike, and paid the price at Singapore. The unprecedented scale and timing of the attacks throughout the Asia-Pacific theatre added to this surprise. The British and Americans believed Japan would be a tough nut to crack, but never thought that they could launch so many major attacks against multiple targets. The simultaneous attacks were born out of a compromise between the IJA, which wanted the first strike to fall on Malaya to prevent the British from digging in, and the IJN, which wanted to remove any naval threat posed by the Philippines as quickly as possible. The area involved in the initial Japanese offensive was so massive that the operations were broken into three stages. First, the seizure of Guam, Wake Island and the Gilberts, securing Japan's strategic perimeter, followed by the conquest of Thailand, northern Malaya, Borneo and the Philippines. Finally, the Japanese would push on southern Malaya, Singapore, southern Burma and the Dutch East Indies. These initial operations left the Japanese forces dangerously overstretched. There was little leeway for the different phases. If one part of the plan failed, the entire offensive may have fallen apart. Tactical surprise, deception, accurate intelligence, perfect coordination and speed were absolutely vital. The sheer audaciousness of the Japanese offensive, stretched over thousands of kilometres of territory with attacks on every point of the compass, enabled the Japanese to fool the British and Americans as to exactly where and when they would strike. They were fooled because of beliefs in Japanese caution, and an inflated sense of their own power, but not simply through underestimation of Japanese capabilities, though the latter contributed to the former problems.[413]

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[413] Evans and Peattie, *Kaigun*, 468-470; John Ferris, "'Consistent with an Intention': The Far East Combined Bureau and the Outbreak of the Pacific War, 1940-41." *Intelligence and National Security* 27:1 (2012): 5-26.

Tactical surprise was not the only factor which contributed to the initial string of Allied disasters in the Pacific War. Both the British and Americans lacked the available forces to counteract the Japanese threat. Most British land, sea and air assets were tied up in Europe against Germany and Italy. The United States had only begun to rearm in the late 1930s and would not start to reap the benefits of their overwhelming industrial strength until 1943. The British and Americans did develop successful long term naval strategies, based on assessments of Japan's inability to win a protracted war of attrition, but the forces required to contain Japan early on in the conflict were unavailable, due to the severe restrictions in defence spending during the 1920s and early 1930s. The American adoption of a "Germany first" policy starved the USN of the resources required to defend the Far East.[414] Only from September 1941 did British and American statesman make the policy decision to build up forces in East Asia. Ferris described this situation as the "central strategic fact of December 1941." Japan had such overwhelming strength in the Far East that the capture of Singapore was "almost inevitable."[415]

The poor understanding of the tactics and technology of the Japanese air services certainly contributed to the early defeats, but much less so compared to other factors. Surprise and overwhelming local numerical superiority made the results of the early engagements almost certain. The impact of misunderstanding the quality of Japanese pilots and aircraft was limited to the low tactical level, and proved fatal there. Many American pilots found themselves fighting large numbers of aircraft that were of unexpectedly high quality. This contributed to errors in judgement that prevented them from resisting as effectively as they could have done with a better

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[414] Douglas Ford, "A Statement of Hopes? The effectiveness of US and British naval war plans against Japan, 1920-1941," *The Mariner's Mirror* 93:3 (2007): 63-80.
[415] Ferris, "'Worthy of Some Better Enemy,'" 256.

understanding of the aircraft and pilots they confronted. John Toland details one instance where the failure to believe and disseminate technical details of the Zero left American fighter pilots in the Philippines disoriented and unsure how to combat the aircraft.[416] However, this error was not the deciding factor for these early air campaigns. It is telling that the Allied air power histories of the early part of the war have titles such as "Bloody Shambles," "Doomed at the Start" and "Every Day a Nightmare."[417] When mistakes made at the tactical and technological level had larger consequences, it was almost always linked to surprise. For example, the ability of Japanese aircraft to strike at extremely long range caught the Americans and British off guard multiple times, most notably at Singapore and in the Philippines, where the AA defences and air bases were unprepared.[418]

Failures in the assessments of the IJN's tactics and technology played a smaller role. After the shock of Pearl Harbor, the lack of knowledge concerning the IJN's carrier doctrine did not prevent the Americans from holding their own at the Battle of the Coral Sea and crushing the Japanese at the Battle of Midway. The IJN was the undeniable world leader in the massed use of carrier air power at the start of the Pacific War, and its level of sophistication would not be surpassed by the USN for over two years.[419] Despite this, both sides had difficulty understanding exactly how a carrier engagement would play out in wartime, and made similar mistakes in crucial areas, like scouting. Luck and poor decision making at the operational and strategic level

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[416] John Toland, *The Rising Sun: The Decline and Fall of the Japanese Empire, 1936-1945* (New York: Modern Library, 2003), 234.
[417] Christopher Shores et.al., *Bloody Shambles*, 3 vols. (London: Grub Street Publishing, 1992); William H. Bartsch, *Doomed at the Start: American Pursuit Pilots in the Philippines, 1941-1942* (College Station: Texas A&M University Press, 1992); William H. Bartsch, *Every Day a Nightmare: American Pursuit Pilots in the Defense of Java, 1941-1942* (College Station: Texas A&M University Press, 2010).
[418] Toll, *Pacific Crucible*, 49; for the best account of the initial American disaster in the Philippines, see William H. Bartsch, *December 8, 1941: MacArthur's Pearl Harbor* (College Station: Texas A&M University Press, 2003).
[419] Parshall and Tully, *Shattered Sword*, xxi.

ensured that Japan paid the price of such flaws first.[420] The Americans did not need to know the weaknesses in the Japanese system in order to benefit. Not until the American and Japanese surface fleets clashed off Guadalcanal in late 1942 did errors in assessment of Japanese tactics and technology come to the fore once again. They certainly contributed to the American defeats at the Battles of Savo Island and Tassafaronga, but even in those cases other factors, especially tactical surprise and confusion, were more important than the failure to recognise the quality of Japanese night fighting abilities and torpedoes.

The main result of the underestimation of Japanese technological and tactical competence was the shock and embarrassment which followed the defeats. As the attack on Pearl Harbor unfolded, civilians and military men alike were bewildered at what was occurring around them. Numerous stories discuss their initial belief that it was all an extremely elaborate and realistic drill put on by the United States Army Air Force. This belief stemmed both from the achievement of tactical surprise by the Japanese, and the low opinion of their capabilities. The American public in particular was led to believe that Japanese naval aviation was nearly impotent.[421] In military circles, the shock of Pearl Harbor and other initial defeats drove appraisal of Japanese tactical and technological abilities far in the other direction. This shift has persisted within the historiography of the Pacific War until recently. Gordon Prange constantly uses phrases like "brilliantly conceived and meticulously prepared" to describe the Japanese attack on Pearl Harbor.[422] The entire operation is portrayed as almost flawless in numerous histories, which were largely devoid of any detailed critical analysis. This implies that the Japanese were

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[420] Anthony Tully and Lu Yu, "A Question of Estimates: How Faulty Intelligence Drove Scouting at the Battle of Midway," *Naval War College Review* 68:2 (2015): 85-99.
[421] Toll, *Pacific Crucible*, 8-10.
[422] Prange et.al., *At Dawn we Slept*, 203.

near super human in the early part of the Pacific War, reflecting the views of shocked military men at the time. However, recent scholarship has debunked that assumption. Pearl Harbor was one of the last events to be re-examined with a more critical eye. Zimm, assessing each step of the Pearl Harbor operation, from its planning and strategic reasoning, to its tactical and technological elements, found dozens of flaws at all levels.[423] The shock of defeat by a military American observers assumed was weak is the most lasting impact of the underestimation of Japanese air and naval power in the interwar years.

This work is the first to compare American assessments of Japanese air and naval power side-by-side at all levels, from tactics and technology to strategy and industry. It shows that the Japanese air services were more underestimated than the IJN, and in both cases, their most innovative rather than their more conventional components, with a larger impact during the war. The American realisation of the quality of Japanese air power occurred right from the outset of the war, paired with the surprise of the initial attacks, magnifying its significance. Japanese air power was the primary hammer wielded during the opening operations, while the IJN fought in a few small engagements or acted as an aircraft delivery system. Since the IJN never exploited its superiority on the battle line as it hoped, American failures in assessing these areas proved irrelevant. The shock from the early part of the war came from the quality of Japanese air power, not its surface fleet: the legendary reputation of IJNAS aviators and the Zero still feature in histories to this day. A consistently middling assessment of the IJN's capabilities proved less damaging than a decline from excellence to ignorance in assessment of the Japanese air services. The American underestimation of Japanese air and naval power gave Japan a small, but not

[423] Zimm, *Attack on Pearl Harbor*, 7-14.

insignificant, force multiplier during the early part of the war. American pilots were caught off guard by the quality of Japanese aircraft and pilots they confronted, and many were shot down in the midst of their bewilderment. The USN found itself being schooled in the art of night fighting and torpedo warfare by a navy which American observers had assumed would be at most equal to themselves. It was in these specific instances of combat where incorrect assessments of Japanese air and naval power mattered. Ultimately, these errors did not prove decisive. The accurate assumption that Japan could not win a prolonged war of attrition against the United States was what mattered most. However, the errors in assessing Japanese tactics and technology were not irrelevant. In their haste to predict the setting of the Sun, the Americans failed to appreciate the danger of its rise.

References

Primary Sources

United States National Archives and Records Administration, Washington, D.C. (NARA 1)
RG 38, Records of the Chief of Naval Operations
ONI, Intelligence Division, *Naval Attaché Reports, 1886-1939*

United States National Archives and Records Administration, College Park, Maryland (NARA 2)
RG 38, Records of the Chief of Naval Operations
ONI, Foreign Branch, *Naval Attaché Reports from Tokyo*
ONI, Intelligence Division, *Selected Naval Attache Reports Relating to the World Crisis, 1937-1943, Roll 2*.

US Military Intelligence Reports, Japan, 1918-1941. Frederick: University Press of America.

Baker III, A.D., ed. *Japanese Naval Vessels of World War Two as seen by U.S. Naval Intelligence*. Annapolis: Naval Institute Press, 1987.

Cook, Haruko Taya and Theodore F. Cook. *Japan at War: An Oral History*. New York: The New Press, 1992.

Hara Tameichi, Fred Saito and Roger Pineau. *Japanese Destroyer Captain: Pearl Harbor, Guadalcanal, Midway — The Great Naval Battles as Seen Through Japanese Eyes*. Annapolis: Naval Institute Press, 2011.

Horikoshi Jiro. *Eagles of Mitsubishi: The Story of the Zero Fighter*, trans. Shojiro Shindo and Harold N. Wantiez. Seattle: University of Washington Press, 1981.

Ozawa Jisaburo. "Development of the Japanese Navy's Operational Concept against America." In *The Pacific War Papers: Japanese Documents of World War II*, ed. Donald M. Goldstein and Katherine V. Dillon. Washington, D.C.: Potomac Books, 2004.

Pratt, Fletcher. *Sea Power and Today's War*. New York: Harrison-Hilton Books, 1939.

Puleston, W.D. *The Armed Forces of the Pacific: A Comparison of the Military and Naval Power of the United States and Japan*. New Haven: Yale University Press, 1941.

Sakai Saburo, Martin Caidin and Fred Saito. *Samurai!*. Annapolis: Naval Institute Press, 1991.

Spector, Ronald H., ed. *Listening to the Enemy: Key Documents on the Role of Communications Intelligence in the War with Japan*. Wilmington: Scholarly Resources, 1988.

Secondary Sources

Fighter Combat Comparisons No. 1: Grumman F6F-5 Hellcat vs. Mitsubishi J2M3 Model 21 Raiden ('Jack'). Teaneck: Tacitus Publications, 1989.

"Japan: 40 cm/45 (15.9") Type 94, Actual Size 46 cm (18.1")." In *NavWeaps: Naval Weapons, Naval Technology and Naval Reunions*, http://www.navweaps.com/Weapons/WNJAP_18-45_t94.htm (15 October 2015).

Agawa Hiroyuki. *The Reluctant Admiral: Yamamoto and the Imperial Navy*, trans. John Bester. New York: Kodansha America, 2000.

Asada Sadao. *From Mahan to Pearl Harbor: The Imperial Japanese Navy and the United States*. Annapolis: Naval Institute Press, 2006.

Barnhart, Michael A. *Japan Prepares for Total War: The Search for Economic Security, 1919-1941*. Ithaca: Cornell University Press, 1987.

Bartsch, William H. *December 8, 1941: MacArthur's Pearl Harbor*. College Station: Texas A&M University Press, 2003.

———. *Doomed at the Start: American Pursuit Pilots in the Philippines, 1941-1942*. College Station: Texas A&M University Press, 1992.

———. *Every Day a Nightmare: American Pursuit Pilots in the Defense of Java, 1941-1942*. College Station: Texas A&M University Press, 2010.

Bell, Christopher M. "The Royal Navy, War Planning, and Intelligence Assessments of Japan, 1921-1941." In *Intelligence and Statecraft: The Use and Limits of Intelligence in International Society*, ed. Peter Jackson and Jennifer Siegel. Westport: Praeger Publishers, 2005.

Bergerud, Eric M. *Fire in the Sky: The Air War in the South Pacific*. New York: Basic Books, 2009.

Blair Jr., Clay. *Silent Victory: The U.S. Submarine War against Japan*. Annapolis: Naval Institute Press, 2001.

Boyd, Carl and Akihiko Yoshida. *The Japanese Submarine Force and World War II*. Annapolis: Naval Institute Press, 2002.

Chesneau, Roger, ed. *Conway's all the World's Fighting Ships, 1922-1946*. London: Conway, 1980.

Coox, Alvin D. *Nomonhan: Japan against Russia, 1939.* Stanford: Stanford University Press, 1990.

Dower, John W. *War without Mercy: Race and Power in the Pacific War*. New York: Pantheon Books, 1986.

Dull, Paul S. *A Battle History of the Imperial Japanese Navy, 1941-1945*. Annapolis: Naval Institute Press, 2007.

Dunn, Richard L. "ZERO-SEN Model 21 Performance: Unraveling Conflicting Data." In *j-aircraft.com: Japanese Aircraft, Ships & Historical Research*, http://www.j-aircraft.com/research/rdunn/zeroperformance/zero_performance.htm (13 March 2016).

Evans, David and Mark R. Peattie. *Kaigun: Strategy, Tactics and Technology in the Imperial Japanese Navy, 1887-1941*. Annapolis: Naval Institute Press, 2012.

Ferris, John. "A British 'Unofficial' Aviation Mission and Japanese Naval Developments, 1919-1929." *Journal of Strategic Studies* 5:3 (1982): 416-439.

————. "'Consistent with an Intention': The Far East Combined Bureau and the Outbreak of the Pacific War, 1940-41." *Intelligence and National Security* 27:1 (2012): 5-26.

————. *Intelligence and Strategy: Selected Essays*. New York: Routledge, 2005.

————. "'Worthy of Some Better Enemy?': The British Estimate of the Imperial Japanese Army, 1919-1941, and the Fall of Singapore." *Canadian Journal of History* 28:2 (1993): 223-256.

Ford, Douglas. "A Statement of Hopes? The effectiveness of US and British naval war plans against Japan, 1920-1941." *The Mariner's Mirror* 101:1 (2015): 63-80.

————. "'The Best Equipped Army in Asia'?: U.S. Military Intelligence and the Imperial Japanese Army before the Pacific War, 1919-1941." *International Journal of Intelligence and Counterintelligence* 21:5 (2008): 86-121.

————. *The Elusive Enemy: U.S. Naval Intelligence and the Imperial Japanese Fleet*. Annapolis: Naval Institute Press, 2011.

————. "US Naval Intelligence and the Imperial Japanese Fleet during the Washington Treaty Era, c. 1922-36." *The Mariner's Mirror* 93:3 (2007): 281-306.

Francillon, René J. *Japanese Aircraft of the Pacific War*. 2nd ed. London: Putnam Aeronautical Books, 1979.

Goldstein, Erik and John H. Maurer, ed. *The Washington Naval Conference, 1921-22: Naval Rivalry, East Asian Stability and the Road to Pearl Harbor*. London: Frank Cass, 1994.

Hagiwara Mitsuru. "The Japanese Air Campaigns in China, 1937-1945." In *The Battle for China: Essays on the Military History of the Sino-Japanese War of 1937-1945*, ed. Mark Peattie, Edward Drea and Hans Van de Ven. Stanford: Stanford University Press, 2011.

Harmsen, Peter. *Shanghai 1937: Stalingrad on the Yangtze*. Havertown: Casemate Publishers, 2013.

Harvey, A.D. "Army Air Force and Navy Air Force: Japanese Aviation and the Opening Phase of the War in the Far East." *War in History* 6:2 (1999): 174-204.

Hirama Yoichi, "Japanese Naval Preparations for World War II." *Naval War College Review* 44:2 (1991): 63-81.

Hone, Trent. "'Give Them Hell': The US Navy's Night Combat Doctrine and the Campaign for Guadalcanal." *War in History* 13:2 (2006): 171-199.

Hornfischer, James D. *Neptune's Inferno: The U.S. Navy at Guadalcanal*. New York: Bantam Books, 2011.

Jentschura, Hansgeorg, Dieter Jung and Peter Mickel. *Warships of the Imperial Japanese Navy, 1869-1945*, trans. Antony Preston and J.D. Brown. Annapolis: Naval Institute Press, 1977.

Jordan, John. *Warships after Washington: The Development of the Five Major Fleets, 1922-1930*. Barnsley: Seaforth Publishing, 2011.

Kahn, David. "United States Views of Germany and Japan in 1941." In *Knowing One's Enemies: Intelligence Assessment before the Two World Wars*, ed. Ernest R. May. Princeton: Princeton University Press, 1986.

Kennedy, Greg. "Anglo-American Strategic Relations and Intelligence Assessments of Japanese Air Power, 1934-1941." *The Journal of Military History* 74:3 (2010): 737-773.

Kotani Ken. *Japanese Intelligence in World War II*, trans. Chiharu Kotani. Botley: Osprey Publishing, 2009.

Kuehn, John T. *Agents of Innovation: The General Board and the Design of the Fleet that Defeated the Japanese Navy*. Annapolis: Naval Institute Press, 2008.

Lacroix, Eric and Linton Wells II. *Japanese Cruisers of the Pacific War.* Annapolis: Naval Institute Press, 1997.

Leary, William M. "Assessing the Japanese Threat: Air Intelligence Prior to Pearl Harbor." *Aerospace Historian* 34:4 (1987): 272-277.

Letourneau, Roger and Dennis Letourneau. *Operation KE: The Cactus Air Force and the Japanese Withdrawal from Guadalcanal*. Annapolis: Naval Institute Press, 2012.

Lundgren, Robert. *The World Wonder'd: What Really Happened off Samar*. Ann Arbor: Nimble Books, 2014.

Lundstrom, John B. *The First Team and the Guadalcanal Campaign: Naval Fighter Combat from August to November 1942*. Annapolis: Naval Institute Press, 2005.

————. *The First Team: Pacific Naval Air Combat from Pearl Harbor to Midway*. Annapolis: Naval Institute Press, 2005.

Mahnken, Thomas G. "Asymmetric Warfare at Sea: The Naval Battles off Guadalcanal, 1942-1943." *Naval War College Review* 64:1 (2011): 95-121.

————. *Uncovering Ways of War: U.S. Intelligence and Foreign Military Innovation, 1918-1941*. Ithaca: Cornell University Press, 2002.

Maurer, John H. and Christopher M. Bell, ed. *At the Crossroads between Peace and War: The London Naval Conference of 1930*. Annapolis: Naval Institute Press, 2014.

Miller, Edward S. *Bankrupting the Enemy: The U.S. Financial Siege of Japan before Pearl Harbor*. Annapolis: Naval Institute Press, 2007.

————. *War Plan Orange: The U.S. Strategy to Defeat Japan, 1897-1945*. Annapolis: Naval Institute Press, 1991.

Morison, Samuel Eliot. *History of United States Naval Operations in World War II*. 15 vols. Annapolis: Naval Institute Press, 2010.

Muir Jr., Malcolm. "Rearming in a Vacuum: United States Navy Intelligence and the Japanese Capital Ship Threat, 1936-1945." *The Journal of Military History, 54:4* (1990): 473-485.

Nofi, Albert A. *To Train the Fleet for War: The U.S. Navy Fleet Problems, 1923-1940*. Newport: Naval War College Press, 2010.

Parshall, Jonathan B. "Oil and Japanese Strategy in the Solomons: A Postulate." In *Imperial Japanese Navy Page*, http://www.combinedfleet.com/guadoil1.htm (22 November 2015).

———— and Anthony P. Tully. *Shattered Sword: The Untold Story of the Battle of Midway*. Washington D.C.: Potomac Books, 2005.

Pauer, Erich. “Japan’s technical mobilization in the Second World War.” In *Japan’s War Economy*, ed. Erich Pauer. New York: Routledge, 1999.

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

Prados, John. *Combined Fleet Decoded: The Secret History of American Intelligence and the Japanese Navy in World War II*. New York: Random House, 1995.

Prange, Gordon W., Donald M. Goldstein and Katherine V. Dillon. *At Dawn we Slept: The Untold Story of Pearl Harbor*. New York: Penguin Group, 1991.

Ritchie, Sebastian. *Industry and Air Power: The Expansion of British Aircraft Production, 1935-41*. London: Frank Cass & Co., 1997.

Rubenstein, Murray. *Fighter Combat Study Number One: The Curtiss P-40C vs. The Mitsubishi A6M2 Model 21 Zero-Sen*. Biloxi: Gamescience Corporation, 1976.

Shores, Christopher, Brian Cull and Yasuho Izawa. *Bloody Shambles*. 3 vols. London: Grub Street Publishing, 1992.

Stille, Mark. *Imperial Japanese Navy Destroyers, 1919-45 (2): Asashio to Tachibana Classes*. Botley: Osprey Publishing, 2013.

Toland, John. *The Rising Sun: The Decline and Fall of the Japanese Empire, 1936-1945*. New York: Modern Library, 2003.

Toll, Ian W. *Pacific Crucible: War at sea in the Pacific, 1941-1942*. New York: W.W. Norton & Company, 2012.

Tully, Anthony and Lu Yu. “A Question of Estimates: How Faulty Intelligence Drove Scouting at the Battle of Midway.” *Naval War College Review* 68:2 (2015): 85-99.

Willmott, H.P. *The Barrier and the Javelin: Japanese and Allied Pacific Strategies, February to June 1942*. Annapolis: Naval Institute Press, 2008.

Zimm, Alan D. *Attack on Pearl Harbor: Strategy, Combat, Myths, Deceptions*. Havertown: Casemate Publishers, 2011.