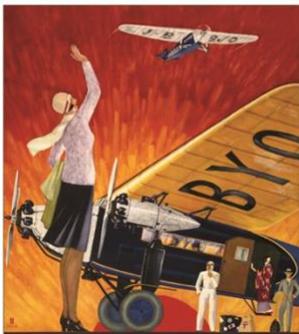




Jürgen Melzer, *Wings for the Rising Sun: A Transnational History of Japanese Aviation*. Cambridge, MA: Harvard University Asia Center, 2020. xxvi, 339 pp. ISBN 9780674244429

WINGS FOR THE RISING SUN
A TRANSNATIONAL HISTORY OF JAPANESE AVIATION
— JÜRGEN P. MELZER —



Since the publication of Peter Fritzsche's pioneering *Nation of Fliers: German Aviation and the Popular Imagination* in 1992, studies of air-mindedness and aviation in other national contexts have proliferated.¹ In addition to works on Russia, Britain, and Thailand, a variety of monographs on American aviation history and culture have followed in Fritzsche's flight path.² Several valuable books on aircraft technology and the aviation industry in Japan have appeared in English as well, notably Richard Samuels' "*Rich Nation, Strong Army*": *National Security and the Technological Transformation of Japan*, Mark Peattie's *Sunburst: The Rise of Japanese Naval Air Power, 1909-1941*, and the translated memoirs of the chief engineer of the famed Mitsubishi Zero fighter.³ Even in this increasingly crowded historical literature, Jürgen Melzer's ambitious volume on the development of Japanese aviation in a specifically transnational context is a welcome and eye-opening addition. Although at its heart Melzer's book is a

study of technology transfer and the emergence of domestic design and manufacturing capabilities in the Japanese aviation industry, it ranges widely across military strategy and international relations, media cultures and popular sentiments, and the political economy of flight in modern Japan.

Wings for the Rising Sun pivots on three central arguments, each of which Melzer supports with ample (and often richly detailed) evidence. First, he argues that the history of Japanese aviation is a thoroughly transnational one, with aeronautical knowledge and innovation

¹ Peter Fritzsche, *Nation of Fliers: German Aviation and the Popular Imagination* (Cambridge, MA: Harvard University Press, 1992).

² Scott Palmer, *Dictatorship of the Air: Aviation Culture and the Fate of Modern Russia* (New York: Cambridge University Press, 2006); Michael McCluskey and Like Seaber, eds., *Aviation in the Literature and Culture of Interwar Britain* (New York: Palgrave Macmillan, 2020); Edward Young, *Aerial Nationalism: A History of Aviation in Thailand* (Washington, DC: Smithsonian, 1994); Jenifer Van Vleck, *Empire of the Air: Aviation and the American Ascendancy* (Cambridge, MA: Harvard University Press, 2013); Dominick Pisano, *The Airplane in American Culture* (Ann Arbor: University of Michigan Press, 2003).

³ Richard Samuels, "*Rich Nation, Strong Army*": *National Security and the Technological Transformation of Japan* (Ithaca, NY: Cornell University Press, 1994); Mark Peattie, *Sunburst: The Rise of Japanese Naval Air Power, 1909-1941* (Annapolis, MD: Naval Institute Press, 2002); Jiro Horikoshi (Shojiro Shindo and Harold N. Wantiez, trans.), *Eagles of Mitsubishi: The Story of the Zero Fighter* (Seattle: University of Washington Press, 1992).

circulating constantly from the late nineteenth century among European, American, and Japanese engineers, industrialists, and military leaders. Second, Melzer asserts that the process of technology transfer and Japan's ultimate achievement of technological autonomy from the West were based on a technological system that fused the military, industry, and structured but flexible learning from abroad in a way that (to borrow Melzer's oxymoron) "institutionalized innovation." Finally, as in Germany and other nations committed to the advance of airpower, public enthusiasm for aviation, stoked by the media and strongly tinged with nationalism in the decades prior to World War II, played a critical role in propelling the rapid growth of the Japanese aircraft industry.

Melzer's volume is essentially chronological in organization, starting with the mania for ballooning in the late nineteenth century. Balloons were one of the spectacular new technologies that flooded into Japan after the Meiji Restoration and which captured the public imagination. They also caught the eye of the Japanese military, which was acutely aware of its relative technological backwardness and was actively seeking out the most up-to-date innovations from the West. The Japanese Naval Academy launched the nation's first manned balloon in 1877 and by the 1890s precocious Japanese inventors were creating novel designs and building larger (and later, engine-powered) airships. Although the Army successfully deployed balloons for reconnaissance at the Siege of Port Arthur in the Russo-Japanese War, the poor safety and reliability records of lighter-than-air vessels soured military officials on them. Moreover, rapid progress in Western airplane technology and the vision of "battleships in the air" soon captivated Japanese military planners. Thus, in December 1910 (not even seven years after the Wright Brothers made history at Kitty Hawk), a biplane imported from France and piloted by a Japanese Army captain took to the skies from the Yoyogi military parade ground in Tokyo, in front of a raucous crowd of 100,000 people, achieving Japan's first motorized flight.

The rivalry between the Army and Navy in Imperial Japan is well known and, as Melzer documents, profoundly shaped the progress of Japanese aviation from its earliest days. The two services were notoriously secretive and competitive in their development of new technologies, independent in their strategic visions of military aviation, and distinct in their practices of working with private-sector suppliers and overseas partners. Mirroring this bifurcation, Melzer looks first at the evolution of Army airpower, which initially surged during World War I, before concentrating on naval aviation, which was somewhat slower to develop due to the Navy's fixation on capital ships and firepower. In both cases, he periodizes his narrative based on the shifting influence of foreign nations on Japanese aviation as the prime inspiration for Japanese designers and manufacturers waxed and waned over time in response to the perceived technological prowess of various nations (and as Japanese access to foreign technologies and expertise) rose and fell.

In the 1910s, as France was generally regarded as the leading nation in aeronautical technology, the Japanese Army dispatched pilots to be trained there and procured aircraft from French firms. World War I, in which the Japanese fought on the Allied side, affirmed the rising importance of airpower: Japanese planes engaged inconclusively with German aircraft over Qingdao in 1914 and logged a total of 135 sorties and 234 bombings. In order to build Japan's capabilities in aviation design, manufacturing, and operation, the Japanese government appealed to the French for assistance. The military authorities in Paris, eager to maintain their influence in Japan and assist an ally, provided a large team of French officers, flight instructors, and

aeronautical experts to Japan to train pilots, factory workers, and engineers. The high-profile delegation further spurred public enthusiasm for aviation, which had surged with breathless reports from the skies over Qingdao.

After the Armistice, however, it became increasingly obvious to Japanese Army planners that technological leadership in aviation had passed from the French to the Germans during the course of the war. Conveniently for Japan, the peace settlement provided an opportunity to transfer German technology and expertise to Japan's fledgling air forces and aircraft industry. As one of the victorious powers, Japanese officials had the opportunity to inspect German aviation facilities in great detail and Japan later received a share of the German aircraft and aeronautical equipment that was distributed among the Allies as reparations. The Japanese were also eager to hire skilled pilots, engineers, and workmen from Germany, who were underemployed after the war, and to acquire additional technological innovations from German aircraft manufacturers. The Versailles Treaty prohibited such arrangements, but the Japanese Army, committed to building up its air arm and developing an independent domestic aviation industry, found a series of workarounds that allowed German know-how to flow almost unimpeded into Japan during the 1920s.

Particularly important to this intensive process of technology transfer were the establishment of key corporate partnerships between German and Japanese firms and the employment of leading German engineers by Japanese aircraft manufacturers. Kawasaki, for example, linked up with the German manufacturer Dornier and soon emerged as an international leader in the design of metal monoplane bombers. At Mitsubishi, which partnered successfully with Junkers to improve its engineering and fabrication capacities, the engagement of Alexander Baumann (who had held Germany's first professorship of aeronautical engineering) as a consultant and trainer was transformative. A prominent symbol of Japan's rapid advances in aviation technology was the design and construction of the Mitsubishi Type 92 Superheavy Bomber, the world's largest bomber (and thus something of an aircraft analogue of the battleship *Yamato*), which made its maiden flight in 1931, just months after the Manchurian Incident. The ponderous Type 92 was never used in combat but marked an important step in the achievement of an autonomous Japanese aviation industry and was a public relations triumph, inspiring raptures from a patriotic media and populace.

The Imperial Navy, meanwhile, despite a "big-ship, big-gun" fixation since the Russo-Japanese War, followed developments in Western naval aviation closely and sought to keep pace at a time when "military innovation became a dominant element of national security" (140). Unlike the Army, which came to depend entirely on private firms for new aviation technology, the Navy invested in centralized research and development facilities in aeronautics, partnering with civilian contractors in design and manufacture. Although naval aviation drew upon German expertise after World War I (especially in the design of float planes, through a relationship between Heinkel and the Japanese aircraft maker Aichi), the major influence on Navy technology and strategy during the 1920s was from Great Britain. British influence had been strong in the Japanese Navy from its very origins and it only seemed natural that British engineers, flight trainers, and test pilots flocked to Japan, individually and on government-sponsored missions. The British impact was most obvious in the development of aircraft carriers and carrier-based planes: Japan's

first carrier, the *Hōshō*, was modeled on the pioneering HMS *Furious* and was commissioned in 1922; the nation's first carrier-deck landing, cheered by the media and the general public, took place the following year with a Mitsubishi Type 10 Fighter, a new model designed and constructed with extensive British input.

After 1930, British influence on Japanese naval aviation declined rapidly, due partly to increasing interest in German and American technology, but more importantly, Melzer argues, because “Japan’s naval arsenals and civilian aircraft makers had caught up with and, in many respects, surpassed their former mentors” (170). A key advance was the mastery of airframe fabrication during Duralumin, a strong, lightweight alloy developed in Germany and brought to Japan through a cooperative agreement between Mitsubishi and the leading aircraft designer Adolf Rohrbach. Interwar naval arms limitation agreements—the Washington Treaty of 1922 and the London Treaty of 1930—spurred the development of naval aviation as the treaty restrictions did not extend to carriers or aircraft. By the mid-1930s, as Japan designed and built advanced float planes and carrier-based aircraft, came to lead the world in dive-bombing technology, and laid down a new generation of potent aircraft carriers, Japanese naval aviation had achieved what Melzer calls “technological independence.”

Even as the technology gap between Japan and the leading European powers narrowed and eventually disappeared, Japanese naval planners and engineers continued to look abroad for inspiration and innovation. In the years leading up to Pearl Harbor, it was the American aircraft industry that caught their attention. U.S. military aviation had long languished, but American civil aviation flourished, even during the Depression. In the 1930s, Japanese aircraft makers absorbed and indigenized American technology in engine and propeller design, adapted U.S. commercial planes for military uses, and, above all, sought to transfer advanced American manufacturing techniques based on Fordist mass production and the use of specialized machine tools. Until 1940, even as U.S.-Japanese tensions in the Pacific were escalating rapidly (due largely to Japanese bombing of civilian targets in China and the sinking of the American gunboat *Panay* by Japanese aircraft in 1937), Japanese missions to the United States continued to have access to American aviation factories and were able to buy large quantities of American machine tools. As Melzer convincingly shows, American observers consistently underestimated and disparaged Japanese advances in aviation, despite the fact that Japanese-designed and built aircraft were setting records for speed and flight range in the late 1930s.

Achievements during World War II in jet and rocket propulsion were a testament not just to the technological capabilities of Japanese aeronautical engineers and manufacturers, but also to their resourcefulness and resilience under extraordinarily trying circumstances. The Japanese Army had begun experimenting with rocketry in the 1930s but the Navy only started in 1942, when war planners started to pin their hopes on revolutionary new technologies that could turn the tide against a foe with far greater material resources. Progress was slow until 1944, when the German Ministry of Aviation shared very basic plans for a jet engine with Japanese naval engineers. Within the span of just a year, Japanese technologists overcame “grueling time pressure, dwindling resources, and the constant threat of all-out air raids” (236) to design and fabricate airframes, engines, and propellants. Just weeks prior to the dropping of the atomic bombs on Hiroshima and Nagasaki, two revolutionary Japanese aircraft—Mitsubishi’s rocket-powered

Shūsui and Nakajima's Kikka jet—took off on their first test flights, one abortive, the other successful. In the end, Japanese jets and rockets came too late to make any contribution to the war effort, but they demonstrated that “Japan's aviation technology once more has overtaken that of [its] wartime enemies” (262).

Melzer ends his book with a short epilogue on the postwar period, stressing transwar continuities and, above all, the enduring “close connection among the industry, military, and public [that was] a unique feature that defined the development of aviation in Japan” (264). Arguing that the postwar rebirth of Japanese aircraft manufacturing was “a replay of its pre-1945 history, when the country evolved from a late starter to a major player,” Melzer shows how the Japanese government and private firms carefully managed technology transfer, navigated complex geopolitics, and regained technological independence and a record of innovative design.

More than anything, *Wings for the Rising Sun* shows remarkable breadth. Melzer does an admirable job of providing a holistic view of Japanese military aviation, having avoided the temptation to make his research more manageable by focusing on just one of the military services, or on the influence of a particular foreign country (such as Germany), or on a single Japanese aircraft manufacturer or arsenal. Although Mitsubishi figures prominently in Melzer's story (both before and after World War II), he touches at least briefly upon every major military aircraft producer in Japan's highly fragmented prewar aviation industry. Melzer also successfully situates his analysis at the intersection of business history, the history of technology, diplomatic and international history, military history, and the history of Japanese mass media and culture. He makes extensive use of corporate histories, where available. He is much less thorough, however, in placing the aviation industry in the history of Japanese manufacturing and management, and he does not cite even the standard English-language sources in production and labor management here. Nonetheless, one cannot help but be impressed by how much ground (or airspace?) Melzer covers in a relatively concise, tightly organized, and well-presented volume.

Nevertheless, for all the important contributions of *Wings for the Rising Sun*, there are some disappointing aspects to Melzer's treatment and a few curious omissions. First, Melzer pays remarkably little attention to the celebrated Mitsubishi Zero fighter, presumably the best possible example of Japanese technological independence, not just in aviation, but in mechanical engineering in general prior to 1945. Given the focus on the Zero in other English- and Japanese language sources on Japanese airpower, Melzer may well have considered a reiteration here unnecessary but, from the reader's perspective (and for the sake of his overall arguments), it is missed in this otherwise quite thorough book. Second, the volume's striking cover image—a poster for Japan Air Transport, suggesting the romance of passenger air travel in the interwar period—seems an odd choice, even a deceptive one. *Wings for the Rising Sun* is a very much a history of military aviation, with only incidental mention of the evolution of Japan's civil and commercial aviation sectors. This is not a broad study of air-mindedness, like Fritzsche's path-breaking book, or of the experience of flight, as the cover seems to connote.

Third, while Melzer makes much of Japan's attainment of technological independence in aviation, he could have been considerably more explicit in detailing what this means and why it is significant. Melzer documents well the thoroughness of Japanese aviators

and engineers in learning from the West and adapting Western technologies, making numerous incremental improvements in design. But he provides no examples of Japanese engineers making substantial breakthroughs in aeronautical or production technology, nothing comparable to advances like Duralumin, the variable-pitch propeller, or turret launching of floatplanes (all European or American advances later adopted in Japan). Moreover, Japanese aviation seemed to remain dependent on imported models even well after the point when Melzer asserts technological independence: Japanese arsenals and manufacturers continued to reverse engineer Western planes through most of the 1930s, American machine tools were critical to Japanese mass production of aircraft, and German innovations were essential to Japan's wartime jet and rocket projects.

Fourth and finally, *Wings for the Rising Sun* is very much a free-standing narrative and Melzer does not engage directly with the secondary literature, either in the book's text or in the notes. What is particularly surprising (and unfortunate) is that Melzer does not specifically address Samuels' "*Rich Nation, Strong Army*" which focuses, like this study, on Japanese military aviation, on international flows of technology, and on the relationships among military planners, bureaucrats, engineers, and industrialists in the development of Japanese airpower. Although Melzer's conclusions appear broadly consistent with Samuels', *Wings for the Rising Sun* lacks social scientific rigor in defining and generalizing concepts of potential broad utility like "institutionalized innovation." Melzer also misses the opportunity where he goes well beyond Samuels' analysis—as with his transnational contextualization of Japanese aviation or his emphasis on popular media—to demonstrate just how novel and valuable his approach and this study can be. In spite of these shortcomings, *Wings for the Rising Sun* is a rich and thought-provoking source for anyone interested in the story of aviation, the process of technology transfer and innovation, and the public enthusiasm for flying machines in modern Japan.

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