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# ‘A Fundamental Weapon’: The Transatlantic Air Power Controversy of the Early 1920s and the US Navy as a Learning Organisation.[1]

Ian Horwood and Christopher Price

*York St John University*

**Abstract**

In the period following the First World War, air power theorists argued a future war would be decided from the air. Bombing aircraft would fly with impunity over an enemy’s territory and so disrupt the means of sustaining war and economy that popular revolt would force surrender on its government. Britain was at the forefront of developments in this area and the creation of the Royal Air Force, the world’s first, stimulated demand for a similar unified air service in the United States. This debate was played out with particular drama in the US public life, and transatlantic intellectual currents had an important bearing on the outcome. The campaign for a US Air Force on the British model was led by the flamboyant General William ‘Billy’ Mitchell of the US Army Air Service. In Britain, the RAF had absorbed the Royal Navy’s air arm and the US Navy was determined to avoid a similar fate, creating a predictable and bitter struggle between the Navy, Mitchell and his followers. Mitchell was unsuccessful in his campaign, though later revered as the “father” of the US air Force’, while the Navy retained control of its air arm but struggled to shake off its opponents’ caricature of the organisation as resistant to innovation as represented by air power and obsessed with the retention of the outmoded battleship as the principal capital unit. We argue, by contrast, that the US Navy was an exemplary learning organisation closely interested in the development

[1] The authors are indebted to the staff of the Naval Historical Collection Archive, US Naval War College, Newport, Rhode Island, without whose patience and professional expertise the article could not have been completed.

and application of technology, and mindful of the impact of technological innovation on doctrine. We argue that debates played out at the Naval War College, literally in the case of wargames, in the years of the Mitchell controversy laid the foundations for the success of US Naval aviation in World War Two.

Keywords: Aircraft carrier, US Navy, Royal Navy, Royal Air Force, Billy Mitchell, Air-power, wargame, Naval War College, dreadnought battleship.

The conflict between air power champion William S. 'Billy' Mitchell, The US Navy and his political and military superiors constituted a famous episode in US military history, which also resonated in political debate and popular culture. The struggle encompassed interservice rivalry, political intrigue and important debates surrounding the future of the US armed services and warfare itself. It also reflected a transatlantic intellectual space in the technological development of air power, and in the efforts of naval air power theorists to evolve air power techniques specific to their medium while safeguarding the independence of their air arms.

In this article we argue that in contrast to the dogmatism of their rivals advocating a unified air service, the US Navy was a learning organisation which sought to exploit technological advances, but which was also aware of the limitations of current technology in shaping its policy. It is also asserted that this debate was a transatlantic phenomenon. The US Navy viewed innovative use of Air power in the Royal Navy with fascinated respect, but it also regarded the creation of the Royal Air Force as a salutary example and a portent of the threat to its own air arm. It is our contention that the US Navy drew appropriate conclusions from the British experience in formulating its own successful yet distinct doctrine.

The impact of the Mitchell furore on subsequent debate has meant that the development of US Naval Airpower has to a large extent been subsumed by the bitter turf war that culminated in Mitchell's disgrace and the solidification of separate Army and Navy air arms in 1926. The Navy is thus seen to occupy an important role, but one tangential to the development of US air power and without lasting significance in this pivotal early period. The Navy stood accused of purblind attachment to the outmoded battleship, to the extent that new aircraft carriers seemed likely at one point to be forced upon it by an impatient Congress. As a feature of the debate, this perspective has been allowed to stand largely unchallenged. It is certainly true that the Navy had a defensive role in the Mitchell controversy and that it fought its corner in the manner of a rearguard action. Nevertheless, the Navy's position in the development and application of technology was far from the caricature presented by opposed parties.

It can be argued that between 1917 and the early 1920s that something resembling an Anglo-American defence community emerged, fostered by close professional contact, a shared language and cultural similarities which were less obvious than the differences but as significant. This intellectual network would dissipate in the interwar period but in some ways it foreshadowed inter- allied cooperation in World War Two and thereafter. The key distinction in the context of the First World War and its aftermath, was that the United Kingdom was very much the senior partner in terms of experience and doctrine, notwithstanding the increasingly pervasive effects on the war of American industrial and financial might.

In the period surrounding the end of World War One, military innovation was most apparent in the United Kingdom. In April 1918 it had created the world's first independent air force, and this was an obvious inspiration to champions of the new arm in other major powers. Mitchell was more involved in this phenomenon than most. As the effective head of the US

Army Air Service in France he had worked closely with leading British advocates of air power including the 'father' of the new RAF, Air Chief Marshal Hugh 'Boom' Trenchard, since presenting himself at the then Brigadier-General Trenchard's HQ at Abbeville in 1917.[2] The British Independent Air Force, as a precursor to the RAF, encapsulated the new thinking that aircraft alone could decide a conflict, by striking at the homeland of the enemy. At this stage the concept was presented in terms of what would later be described as "surgical" precision, predicated on destroying an enemy's economic means of waging war and compelling surrender, though with an open ended suggestion, particularly from Trenchard, that the "moral" effect of such action on the enemy civilian population would be the trigger for politicians to seek terms. If this introduced the ethically troubling possibility of more direct assaults on civilian morale, advocates could argue seductively that even this would preclude any repetition of the slaughter on the western front and be considerably less costly in aggregated loss of human life. Thus, there was a powerful new case for air power and Mitchell was ideally placed to make it in the United States.[3]

It has been argued that: 'Much of the literature relating to bombing has argued backwards from the Second World War experience, particularly by seeking to define RAF area bombing in terms of "Trenchardian" dogma: the attainment of victory through a moral collapse achieved by bombing.'[4] In the American narrative Mitchell performs this retrospective role

[2] Douglas Waller, *A Question of Loyalty* (New York: Harper Perennial, 2004), 123.

[3] See Philip S Meilinger, 'Trenchard and "Morale" Bombing: The Evolution of Royal Air Force Doctrine before World War II', *Journal of Military History* (1996) 60, no. 2: 243-270. Meilinger's article analyses the multiple intellectual currents in the evolution Trenchard's thinking and his influence on the syllabus of the RAF Staff College.

[4] Niall MacKay and Christopher Price. 'Safety in Numbers: 'Ideas of Concentration in Royal Air Force Fighter Defence from Lanchester to the Battle of Britain', *History* 96, no. 323 (2011): 311.

admirably having been cast as the father of the US Air Force in popular and service culture, and indeed as a prophet whose views were vindicated by the experience of the Second World War. In many ways this was inevitable as post- World War One theorists had little empirical evidence from which to develop their theories and as Mitchell argued 'In the development of air power one has to look forward rather than backward and figure out what is going to happen not too much what has happened'. [5] Thus, doctrine came before experience and was validated by it. However, this approach has been criticised on the grounds that 'the actual history of air power was too short, and the degree of analysis generally too shallow, for any significant degree of credence to be placed on particular theories at the strategic level'.[6]

The prophetic cast of air power thinking was reflected in professional education, particularly in the RAF. Its staff college at Andover in Hampshire fully accepted Douhet's air power doctrine as interpreted (and anticipated) by Trenchard, and it did not encourage external interaction of any type. Indeed the RAF generally seemed 'positively keen not to engage with the public in any form'.[7] The College thus resembled a monastery in that its students were inculcated with a fixed doctrine which never changed, and it was not greatly concerned with the operational impact of changing technology assuming, to say the very least questionably, that the future means of implementing its doctrine were not problematical. The College did not inform or respond to technological progress by planning in detail for the conflict it envisaged and the many difficulties that might be encountered. This system formed the polar

[5] William M. Mitchell, *Winged Defense: the development and possibilities of Modern Air Power, Economic and Military* (New York: Putnam's, 1925), 20-21 in Meilinger, 'Trenchard', 245.

[6] Neville Parton, 'The Development of Early RAF doctrine', *Journal of Military History* 72, no. 4 (2008): 1159.

[7] Ibid., 1160.

opposite of that practiced by the US Naval War College, the intellectual centre of Mitchell's great rival in the air power debate.

The Naval War College, as the "home of thought" in the US Navy was also a close observer of intellectual currents in Britain, particularly technical developments in the Royal Navy. In addressing the potentialities of naval air power it too was working on the basis of limited practical experience, but in contrast to the RAF it was aware of this limitation as a matter of the first importance and saw the mastery of technological development as critical to the formulation of doctrine. The War College President in 1921 was the former commander of US Naval Forces in Europe in the First World War, Rear-Admiral William Sims, an aviation enthusiast who was included in a circulation list of air power information closely restricted to the Chief of Naval Operations, the General Board and the Commanders in Chief of the Atlantic and Pacific Fleets.[8] Information was collected by various means from abroad, primarily by the Office of Naval Intelligence including press reports of air-based exercises, particularly by the Royal Navy, and details of naval exercises involving the use of aircraft. For example, in 1921 Sims, as President of the War College, requested from the ONI latest details about British experiments with torpedo bombers and received in return a 'British Admiralty secret publication entitled "History of the Development of Torpedo Aircraft", copy of which was sent to the Naval War College. This publication contains descriptions of technical aviation features, an historical study of torpedo-carrying seaplanes, torpedo details

[8] Strangely Sims seemed to forget this in giving testimony unhelpful to the Navy at Mitchell's court martial. The War College was asked to furnish evidence of the War College President's inclusion in the circulation of papers from the Navy's General Board for the court martial. US Naval War College [Hereafter NWC], Record Group 8, Series 1, Box 30 Folder 11, 'Memorandum for the President of the Naval War College', 24 November 1925.

and records of runs discussion of the tactics of attack of torpedo planes etc.'.[9] Such information was used in the development of US doctrine, and to constantly update fleet information for Staff college wargames which were an important part of this process.

It was not lost on the US Navy, however, or indeed any observer that the new Royal Air Force had engulfed British naval aviation, resulting in a situation in which Royal Navy aircraft carriers would in a future conflict sail to war with an RAF air group. The US Navy had studied the innovative work of the Royal Naval Air Service closely, particularly in terms of the development of aircraft carriers and it viewed the RN's loss of its air arm with some shock and evident revulsion.

When the controversy over air power reached its peak during Mitchell's court martial in 1925, naval officers, particularly in public facing roles, were presented with what might be described as a briefing pack prepared by the Office of Naval Intelligence on the premise that 'it was not considered that the general public had an appreciation of what the Navy has accomplished in aviation'. The file was entitled 'Information on the Subject of Naval Aviation'[10] in which the Navy position was summarised in two areas 'a) What the Navy has done and is doing in aviation' and 'b) objections to a united air force', for explanation to 'especially editors and newspaper and magazine owners, rotary clubs, etc.' The first document of this collection, 'Opinions of Authorities and High Government officials on the subject of united Air Service' assessed the Navy's view of the British condition without nuance:

[9] NWC RG 8, Box 78, Series 2, Folder 7, 'Telegram from NWC to Office of Naval Intelligence, Reply to President of NWC from ONI,' 31 January 1921.

[10] NWC RG8, Series 1, Box 30, Folder 7, 'Information on the Subject of Naval Aviation', 30 April 1925.

The present deplorable condition existing in the Royal Air Force today, in which the fleet commanders have no control over their air units nor does the Captain of a carrier even have authority over the flyers on board, is an example we should well investigate before thinking of making such a mistake ourselves.[11]

The statement went on to outline the most pernicious effects of the new arrangement:

'Discipline is poor. Most of the army men wish they were back in the army, and all of the naval men wish they were back in the Navy: 'It [The Royal Air Force] is a service of no traditions and no accomplishments and its adoption has placed England in the worst predicament she has ever been caught in.'[12]

It had been obvious from the outset that the creation of the RAF presaged a struggle that would also inevitably occur in the United States and, confronted with this horrifying precedent, the Navy had absolutely no intention of meeting the same fate. The US political context was of course quite different to that prevailing in the UK, but it was clear that the Navy would have to undertake a formidable public relations effort to sway both public opinion and Congress, knowing that their opponents in the air power camp would certainly do so.

The chief line of attack on the Navy was the obvious one. Its leaders stood accused of blinkered conservatism in the sense of resisting the obvious merits of seaborne air power in favour of continuing the primacy of the dreadnought battleship (though this was itself an originally controversial technology barely 12 years old in 1918, and one which the US navy had helped to pioneer). This was a successful campaign to the extent that the Navy's

[11] NWC RG8, Series 1, Box 30, Folder 7, 'Opinions of Authorities and High Government officials on the Subject of United Air Service'

[12] NWC RG8, Series 1, Box 30 Folder 7, 'Opinions of Authorities and High Government officials on the subject of united Air Service'.

reservations about committing vast sums at an early stage to an unproven and rapidly developing technology could be misrepresented in terms of institutional resistance to change.

This controversy was fuelled by US Navy tests in November 1920 on the retired battleship *Indiana*, in which effects on the ship of gunfire and aerial bombs were measured in controlled conditions. Mitchell argued that the bombing component of the test was conducted in conditions so artificial as to amount to planned deceit, with the preconceived aim to discredit the potential of aerial weapons at sea.[13] Contrary to Mitchell's assertions, however, the tests on *Indiana* had been conducted with serious intent to discover the effects of bombs.[14] The key problem was that only bombs of a certain weight could be dropped from aircraft launched from a ship. The charges used to simulate bombs thus exceeded the weight that could be carried to the vicinity of the target by an aircraft carrier, which would be the navy's primary form of aerial attack in a fleet action. Dummy bombs dropped by aircraft were intended to judge the likely percentage of hits, with results that impressed the Navy. Mitchell's public campaign was, nevertheless, successful, and he was able to force a further set of tests in June-July 1921 which would be conducted jointly by the Navy and Army. The targets would be modern German warships surrendered to the allies and these would be attacked by real aircraft dropping live bombs in full public view.

In the aftermath of the *Indiana* Tests, the House Committee on Naval Affairs met on 4 February 1921 in a famous gathering to which Mitchell was invited and at which he

[13] See Thomas Wildenberg, *Billy Mitchell's War with the Navy: The Interwar Rivalry over Air Power* (Naval Institute Press, 2013), Chapter 4.

[14] NWC RG 8, Series 2, Box 78, Folder 6, 'Report of Bombing and Gun firing Experiments on the U.S.S. *Indiana* and the U.S.S. *Smith*' (undated received by War College 12 February 1921). This long and meticulous report does not doubt the effect of bombs on ships but presents the tests as a search for more detailed and technically useful information.

pressurised the Navy into acceding to his demand for the tests on captured German vessels.[15] The meeting is interesting for other reasons however, as it collected in one place notable naval experts in the use of air power. Retired Admiral Bradley Fiske had developed a method of evaluating the cumulative impact of battleship gun fire before the famous square law and had become an advocate of naval aviation.[16] Also present was Admiral Sims, whose role as President of the War College was referenced frequently by other members of the Committee as significant to the debate, despite his otherwise general eminence.

The meeting is largely remembered for Mitchell's theatrics, but it involved before his testimony serious discussion of naval air power as the Navy understood it at the time, involving an impressive grasp of the state of theory and technology and the likely path of future development. Sims discussed advanced aerial experiments recently researched at the War College with considerable enthusiasm, and prompted by the questions of the Committee he spoke knowledgeably and indeed passionately about the use of naval air power in terms that stressed his appreciation of the importance of the aircraft carrier, to the extent that he

[15] US Congress, *Naval Policy of the United States: Hearing before the Committee on Naval Affairs, House of Representatives*, Washington D.C.: GPO, 1921.

[16] In a lecture to the War College entitled 'The Torpedo Plane', Fiske noted that the Monthly Information Bulletin from the Office of Naval Intelligence had argued that '"A ship of the FURIOUS or ARGUS Type with 12 or 15 Torpedo planes should be a match for a whole battleship division."' While Fiske considered this an exaggeration he was impressed by British advances and concluded that 'improvements in the torpedo' and other technologies new at the war's end promised much. With reference to the British carriers he stated that: 'To me the appliances that seem to promise the greatest usefulness are aeroplanes, because they carry the most destructive instrumentalities at the greatest speed. It may be that the ARGUS and the EAGLE are prototypes of the battleship of the future.' NWC RG8, Box 2 Folder 7, 'The Torpedo Plane', Lecture delivered by Rear Admiral Bradley A Fiske, USN, 12 September 1919.

advocated the conversion of six battleships building for Wilson's proposed fleet to this role[17] and even suggested a possible future in which 'the airplane carrier becomes a capital ship more powerful than the battleship.'[18]

Sims described in graphic terms the dangers posed to a battle fleet by carrier-based aircraft. He argued that in a fleet action a conventional torpedo attack launched by enemy destroyers could be countered with a strong likelihood of success by the defending fleet's own destroyers in blocking manoeuvres. However, he considered an attack by torpedo carrying aircraft as unstoppable given their ability to manoeuvre swiftly round the fleet. Interestingly he also described a simultaneous attack from different sides of the fleet as presenting an insurmountable difficulty, foreshadowing the "hammer and anvil" attack which would become a feature of aerial torpedo attack in World War Two.[19]

Sims also spoke of the strides which had been made in the Royal Navy in developing carrier aviation, suggesting that Britain was far ahead of the United States to the extent that 'in the air they are superior, as I understand it, to an extraordinary degree'. Pressed by Hicks as to whether this was in respect to carriers or aircraft, Sims replied that 'it is due to both' He went on: 'They have some carriers which they have specially built; they have had experience with them and they have had experience with the machines in connection with the carriers for

[17] *Hearing before the Committee on Naval Affairs,* 669. Sims argued that battle cruisers under construction should not be converted because of their speed compared to battleships, which was equivalent to carriers. His hopes were dashed when battle cruisers *Lexington* and *Saratoga* were in fact converted to become the US Navy's second and third fleet carriers after the converted collier *Langley,* largely because of their speed and the exigencies of the Washington Naval Treaty.

[18] Ibid., 661.

[19] Ibid., 666.

landing them on board. Moreover, they have machines on the other side which are almost ludicrously superior to the ones we have over here.' [20]

Sims argued that even the building "1916" fleet, famously intended to be "second to none" would be deficient in the absence of adequate naval aviation, even if larger than the Royal Navy in respect of capital ships. He stated dramatically:

I do not hesitate to say this. That so great is risk of airplane attack that our fleet as it stands today and what it will be when the ships now under construction are completed, would be of little use in a contest with another fleet adequately supplied with an air force and with improved submarines, and our fleet would easily be defeated. In order to make our fleet of any real use we have got to develop that air force because it is being developed on the other side [of the Atlantic] with great rapidity.[21]

Sims revealed that the War College had also demonstrated that the conversion of two 7,500 ton cruisers under construction to light carriers would provide a net accession of strength to the fleet at a small cost in speed of the vessels from 35 to 33 knots, still much faster than any battleship, while enabling the further development of aircraft and 'that way we could go right ahead with the development of our fliers and also planes which could land on the decks of 30 knot ships'. According to the War College these ships would be worthwhile if they were only used for scouting purposes, adding 200 miles to the visual range of the fleet, but 'they would also have torpedo and bombing planes which would enable you to resist the battle cruisers that came along'.[22]

[20] Ibid., 650.

[21] Ibid., 653.

[22] Ibid., 654-5.

However, Sims was then pressed on the idea of a 'United Air Service' and here his assertion of British superiority ended. He argued unsurprisingly that the naval air arm should be in the hands of naval professionals but provided an interesting rationale based on the experience of the War College. He argued that the College trained officers to fight the fleet as a unit, to the point at which it could react in complex choreography to the simplest commands on the basis of training and experience. This was true of submarines and destroyers and 'we have got to have a similar doctrine as to what airplanes should do. You can not give a detailed order to each subdivision of the force'.[23] Sims stressed the importance of wargaming to the development of the air component of the fleet, stating that 'We work it out on the board; and it is being worked out on the game board in Newport now'.[24]

Mr Oliver noted Sims position as President of the Naval War College in which role he suggested that Sims was 'brought in contact with a number of naval officers'. He asked Sims 'whether many of the officers share your beliefs as to the possibilities of air development?' Sims argued that debate was underway, but that it would remain largely semantic until it had been wargamed. The discussion referenced wargaming frequently, as the primary method of determining issues of doctrine and tactics. Sims point was that it was an accepted way of settling or at least conceptualising practical matters at issue, and he did not presume to suggest what a future game would reveal.

Sims revealed that officers at the War College had been asked to read files describing British developments in the area from the London *Times* and that this having been done, 'the War College, will, therefore be divided into two parts. One part will be given command of the fleet having most airplane carriers, such as the British have built, and the other part will be

[23] Ibid., 651.

[24] Ibid.

given command of the battleship fleet.' Then: 'The battle will be decided in accordance with rules, and when we decide what the rules are to be, then I can tell you whether most people are in favour of the battleship or whether they are not.' Oliver persisted: 'It is a matter, then, that is engaging the very serious consideration of naval officers at the War College at the present time?' Sims repeated: 'We intend to put it on the game board and play the thing out.'[25]

Sims was also at pains to stress that the potential of airpower was not the same as the actuality of airpower at that moment. He made the critical distinction that weapon testing was, to a degree, independent of carrier development. The British had solved the technical issues involved and had 'five or six airplane carriers, some of them converted from cruisers, but some of them Simon-pure carriers. We do not need to know anything about how the carrier is to be built.' The important point was that 'what we want to do now is to develop the bombing and torpedo planes, which will be of the best type.'[26] He noted that development of aircraft could take place independently of the design of carriers because aircraft launched from land could carry heavier weapons than those then able to be launched from ships. The current need was to develop aircraft and armament which could be operated effectively from a ship. The development of carriers was of a part with that of the aircraft which could be flown from them, and the useful weapons loads they could carry. The technical eloquence of this discussion, and its appeal to evidence in resolving airpower issues was not matched by Mitchell's later appearance.

[25] Ibid., 669-70.

[26] Ibid., 668.

However, in the world as it was, technology would have to catch up with the carrier's potential. Sims noted current technical difficulties in the air dropping of torpedoes which did not suffer terminal damage on impact with water, but added that 'I do not believe that American mechanical genius is incapable of developing a torpedo that can be dropped 30, 40 or 50 feet without breaking it, or that it can not make the torpedo so as to prevent the gyroscope from being knocked out'. His key point was that 'we have got to put some money, time, and some steam behind the development of the airplanes themselves – that is to say behind the development of the torpedo carrying airplanes, the torpedoes that they will carry, and the airplane carrier for the planes to fly off from. I do not think there is any question at all in reference to the efficiency of our fleet that is of anything like the importance of pushing ahead with the development of our fleet carriers.'[27]

Sims suggested that if the carrier with aircraft and weapons functioning as then desired were considered to be a capital ship and it met a single enemy battleship it would simply use its greater speed to evade the battleship, which would then be defenceless against its aircraft. Sims stated that the carrier would employ torpedoes against a single ship, but that a meeting with a group of battleships would increase the chance of bomb hits with a larger 'line of battle' target: 'Therefore, assuming that they can be hit with the bombs, and planes can now carry five 1,000 pound bombs, then a battleship can be destroyed by them. They can destroy battleships or so cripple them as a squadron that they would not be able to do much damage. The whole question, as I understand it, is this: is the airplane carrier of the future a capital ship; and, if so, is she a capital ship that is stronger than a battleship?'[28]

[27] Ibid., 657-8.

[28] Ibid., 656.

Ultimately, when asked of the value of the airplane Sims simply stated that 'I regard it as a fundamental weapon'.[29] He added 'I will put it in the form of a bet: If I had the business of deciding this question I feel confidence enough in the inventive ability and the mechanical ability of the American people to believe we can make these planes do what they say they can do, and I would prefer right now to put money into airplane carriers and the development of airplanes.'[30]

Sims did not speak for the Navy as a service, but he was the single most eminent figure within it and as the President of the War College in a position to foster the development and employment of new technology and doctrine. On the evidence of his testimony to the Committee he was every bit as much of an air power visionary as Mitchell, and one much better placed to realise his vision. By the time of the Army-Navy tests, the issues as identified by Mitchell were of no objective value to the Navy. The Navy had no doubt that a bomb of sufficient size, or functional air dropped torpedoes could sink any ship, and the division of a carrier air group into three distinct aircraft types, scouting, bomber and torpedo was already formulated as a concept.

The June-July tests demonstrated the effectiveness of bombs on naval vessels publicly in the most dramatic way, as a number of surrendered German vessels were sunk, culminating in the Dreadnought battleship *Ostfriesland* by the cumulative underwater damage caused by seven 2,000lb bombs dropped from Mitchell's planes, none of which scored a direct hit. An

[29] Ibid., 660.

[30] Ibid., 661.

anonymous report accompanying the copy of the Joint Board's report in the War College files entitled 'Lessons of the Bombing'[31] stated that: 'All vessels attacked by aircraft were sunk by aircraft alone...The fact that they can be so sunk was impressed upon those who witnessed the sinking of the *Ostfriesland*, in 50 fathoms of water, 70 miles off shore in a way that will not soon be forgotten.'

However, Mitchell's continuation of the attack on *Ostfriesland* beyond an agreed point also deprived the Navy of the opportunity to inspect the damage caused by the bombs. The image of the sinking ship was a dramatic illustration of future currents in warfare, but it was technically useless. The 'Lessons' report noted that the 'wide publicity given the exercises, and the partisan character of the discussions preceding them in a measure obscured their real purpose. The general impression seems to have been that the sole object of the tests was to determine whether surface craft could be sunk by aircraft' rather than to obtain information of the effects of different types of ordnance on different classes of ship and the ability of aircraft to find and bomb moving vessels at sea. This information was needed for future reference as the joint report noted succinctly that: 'So far as is known, no planes large enough to carry a bomb effective against a major ship have been flown from or landed on an airplane carrier at sea. It is probable, however, that future development will make such operations practicable.'[32]

While the Board saw a continuing role for the battleship as the primary capital vessel, at a time when no US aircraft carrier was yet serving with fleet, it added: 'Even in the present

[31] NWC RG8, Series 2, Box 78, Folder 7, 'Lessons of the Bombing'.

[32] *Report of the Joint Board on Results of Aviation and Ordnance tests Held During June and July 1921 and Conclusions Reached* Office of the Chief of Naval Operations, Navy Department, Washington D.C. GPO 1921, p.6. (18 July 2017 16.42)

state of development the aircraft carrier, as exemplified by the *Argus* of the British Navy, is a type essential to the highest efficiency of the fleet.'[33]

The sinking of *Ostfriesland* represented the high-water mark of Mitchell's campaign. His advocacy of a separate air force did not sit well with his superiors in the Army and the ultimate joint Army and Navy report was not critical of the Navy. Mitchell was sent abroad, meeting the prophet of air power Douhet, but his case was not made to satisfaction of Administration and Congress in Washington. This period culminated in Mitchell's court martial for lurid criticism of the Navy and his superiors after the loss of the airship USS Shenandoah. Even before the guilty verdict was delivered, the Morrow Board reported to President Coolidge that the Army and Navy air arms should remain separate, though their positions within their services would be enhanced. The Board's recommendation formed the basis of three acts of Congress and the campaign for a Unified Air Service was effectively over.[34] Nevertheless this period falls into a subsequent narrative representing Mitchell as the prophet of air power and effective founder of the US Air Force, whose career was undermined by senior figures in both services who conspired to suppress his message in a self-destructive conspiracy leading directly to Pearl Harbor. This was a powerful cultural construct which neither World War Two nor the creation of the US Air Force did anything to undermine.

However, the mid-1920s did see the final defeat of the effort to remove the Navy's control of its own aviation. Ultimately an Act of Congress recognised the distinct nature of the air arms within each service, including an important stipulation that aircraft carriers must be

[33] Ibid., 7.

[34] Wildenberg, *Billy Mitchell's War with the Navy*, 149.

commanded by an aviator. However, if that battle had been won and Mitchell's campaign against the Navy can be characterised as propaganda, the negative view of the Navy he promulgated remained. To what extent were the views expressed by Sims in Committee acted upon and developed in terms of the Navy's future development of carrier aviation?

The views expressed by Sims in 1921 reflected the fact that at the end of World War One the Navy took a close interest in international developments in air power and the War College was the arm of the Navy most concerned with technological and doctrinal development. Responsible for the professional education of selected officers who had already demonstrated potential suitability for higher command, and who could not reach the rank of admiral without graduating from it, the War College was notably open to external influences.

As Sims implied, wargaming was a central part of the curriculum at the Naval War College between the First and Second World Wars. The use of wargaming answered needs peculiar to the US Navy. It had not been involved in a major war from the Spanish-American War in 1898 until it joined the First World War in 1917, and its role in the latter conflict was minimal. In the absence of major military operations, wargaming provided an opportunity for its senior officers to gain decision-making experience at the fleet level in addition to the opportunity to experiment with technical and doctrinal innovations, without having to go to war or even to sea, the latter being important in the straitened financial circumstances of the interwar period.[35]

[35] A famously satisfied customer of the Naval War College, Admiral Chester Nimitz, (Class of 1922) said in October 1960 of the wargames conducted there that, 'The war with Japan had been re-enacted in the game room here by so many people and in so many different ways that nothing that happened during the war was a surprise – absolutely nothing except the kamikaze tactics towards the end of the war.' Chester W. Nimitz quoted in Francis J. McHugh, *US Navy Fundamentals of War Gaming* (New York, Skyhorse Publishing, 2013), 64.

The simulations at the naval War College supplemented a further type of wargame practised by the US Navy: the live action 'Fleet Problems' held every year between 1923 and 1940. These could be extremely extensive exercises, involving hundreds of vessels over thousands of square miles of ocean. However, even the Problems had their limitations. Although the Navy often assigned much of its strength to these exercises, some vessels could not be released, and of course the Navy had to play both sides. The limitations necessarily imposed on the Problems led to the introduction into them of virtual, or 'constructive', vessels. The Problems were also geographically limited; naturally, the Navy could not carry out problems

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Despite Nimitz's apparent enthusiasm for the War College's wargames, and despite their centrality in the College curriculum, the games have received curiously little attention by historians until recently, and those who have examined them have tended to draw rather more negative conclusions about their value than Nimitz seemed to hold. See Ronald Spector, *Professors of War: The Naval War College and the Development of the Naval Profession* (Newport, R.I.: Naval War College Press, 1977); Michael Vlahos, *The Blue Sword: The Naval War College and the American Mission, 1919-1941* (Newport, R.I.: Naval War College Press, 1980), https://digital-commons.usnwc.edu/historical-monographs/4. By 1986, Vlahos, in his 'Wargaming, an Enforcer of Strategic Realism: 1919-1942,' *Naval War College Review*: 39, No. 2, (March/April, 1986), https://digital-commons.usnwc.edu/nwc-review/vol39/iss2/3 had come to the view that the College manoeuvres had a significant role in the development of the Navy's interwar war-planning, while John M. Lillard, whose volume is the first full length work to deal exclusively with the interwar wargames at the Naval War College, has found that, 'far from being irrelevant rituals, the [College] wargames were definitive instruments of agency. Not only that, but the records reflect that the wargames were an effective instrument…Through lectures, readings, and especially wargames, the War College taught decision making and not decisions'. According to Lillard, 'the games did facilitate naval transformation across not only tactics but strategy and technology as well and the ability to repeatedly practice procedures and experiment with innovations in a low-cost, flexible venue gave the wargames a central role in that transformation'. John M. Lillard, *Playing War: Wargaming and US Navy Preparations for World War II* (Nebraska, Potomac Books, 2016), 130.

designed to simulate war with Japan in Japanese waters. The Navy, therefore, ingeniously adapted its Problems to provide meaningful simulations using locations closer to home.[36]

The Naval War College wargames did not suffer from these limitations. Students could exercise decision-making with respect to the actual forces which might be expected to encounter each other, in the actual regions where they might be expected to fight. The NWC wargames also provided useful additional simulated combat experience, regardless of financial stringency.

Played against colour-coded opponents, mainly Orange for Japan and Red for Britain, the United States was represented by Blue, and while the mechanics of the War College games changed over time, they remained similar throughout the inter-war period. Strategic games – or 'manoeuvres' as they were known were played on maps whereas in the tactical 'manoeuvres', models represented their real-world counterparts, and were given strength, speed and gunnery attributes derived from the known capabilities of the actual vessels represented on the manoeuvre floor. These technical details were updated constantly as the College gathered this information.

The USA actively planned for war with Japan in the inter-war period, and this strategic concern found its way into the Naval War College wargames, the majority of which, during the inter-war years, were fought against 'Orange'. It is well known, however, that amongst its many contingency war plans the USA prepared plans for war with Great Britain, and even an allied Great Britain and Japan in Plan Red-Orange. The original logic behind Plan Red was

[36] Albert A. Nofi, *To Train the Fleet for War: The U.S. Navy Fleet Problems, 1923-1940* (Newport, R.I.: Naval War College Press, 2010), https://digital-commons.usnwc.edu/historical-monographs/18, 19 & 26, Accessed 07/11/19.

the possibility that the economic decline of Britain with respect to the United States, which American planners confidently predicted would continue into the foreseeable future, might provoke a desperate Britain to turn and fight rather than see its hegemony supplanted by that of its former colonies.

Historians have questioned the extent to which Plan Red was the result of a genuine concern that war with Britain was a possibility, especially given the fact that British planners did not view it with the same seriousness and did not produce equivalent British war plans. Certainly, the possibility of such a clash seemed to decline throughout the 1930s even to Americans, though the plan was updated in the mid-1930s.[37] Nevertheless, the Red games persisted, and indeed were still being fought at the College as late as 1940, presumably because the size and tradition of the Royal Navy made it, rather like the England football team of the era, the side to beat: the standard by which the US Navy could measure its own capabilities, and as we have seen, the US Navy was a close observer of the development of naval aviation in Britain, which its leaders saw as being technically in advance of the United States. Plan Red, also, unlike Plan Orange, contained the lure for the US Army of a possible significant land campaign in Canada, or 'Crimson' as the planners styled it.

Michael Vlahos has divided the Naval War College games into three phases:

Early Phase: 1919-1927

Middle Phase: 1928-1934

Late phase: 1935-1941

[37] Christopher M. Bell, 'Thinking the Unthinkable: British and American Naval Strategies for an Anglo-American War, 1918–1931', *The International History Review*, 19:4, (1997), 790-791, DOI: 10.1080/07075332.1997.9640804.

The early phase corresponded to the period dominated by post-First World War disarmament and the Washington naval Conference of 1922; the middle phase was marked by the onset of the European and East Asian political crises and the onset of the Great Depression; and the late phase was marked by increasing international tension, war in Europe and East Asia, and rapid naval expansion in the USA.[38]

The role of aviation was limited in the early period games. John M. Lillard, in his *Playing War: Wargaming and US Navy Preparations for World War II*, has pointed out that this must be seen in 'the context of the technology available at the time'. 'Aircraft bomb loads were too small for them to play a credible role in an offensive strike, so aircraft played primarily a scouting role for the battle line'.[39] This practical limitation in wargames was entirely realistic, but of course the navy was already confident of the likely course of technological development, the impact of which would be recreated faithfully in the wargames.

A 'late' early phase game Tactical Problem II 1925 (TAC II-1925) illustrates nicely the developing centrality of carrier air power even at this early stage. This was a stand-alone Red scenario, created by the War College staff, to place the opposing British and American fleets in contact with each other, with the possibility of a fleet action imminent. The British fleet was crossing the Atlantic with an attendant fleet train in order to establish itself in the Caribbean while the US fleet sought to prevent this.[40] Both fleets included aircraft carriers, but in accordance with the doctrine of the day their role was meant to be confined to scouting

[38] Vlahos, 'Wargaming', 8-14.

[39] Lillard, *Playing War*, 86.

[40] NWC, RG12, Box 3, Blue-Red Tactical Exercise 1925, (Tactical Problem II) (TAC II-1925 (14 January 1925), T2.3.

and spotting for the battleships. The total airpower available to both sides, in terms of raw numbers of aircraft, was roughly equal, though the manner of distribution of aircraft on aircraft carriers was different. The Americans concentrated theirs on two large aircraft carriers, presumably the Lexington and Saratoga battlecruiser conversions permitted by the Washington Naval Treaty, which would come into service in 1927, while the British aircraft were distributed across six smaller carriers.

In the game, both Blue and Red commanders elected to engage in a fleet action, and this raged for several hours of game elapsed time before the umpires drew the game to a close at the end of Move 87. At this point, Red seemed to be winning the engagement. More of its capital ships were able to fire each turn because they had the range advantage of fifteen-inch guns over the shorter range fourteen-inch guns of most US battleships at this time, therefore Red was hitting the Blue capital ships more often than Blue was hitting Red capital ships. The effect of this was that Blue's gunnery strength was declining faster than Red's.[41]

No carriers had been sunk, but both Blue's carriers had been rendered inoperative due to bomb damage to their flight decks, while all six of the Red carriers remained in operation. Blue's aviation capabilities had, then, been severely damaged. However, despite enormous losses of aircraft on both sides, Red had essentially gained air superiority, which in the context of the period, manifested itself most strongly in the ability of Red to spot its fall of shot beyond visual range from the capital ships themselves; thus, Red was even better placed to capitalise on its greater gun range and power than that possessed by Blue.

[41] Ibid., 80 & 89.

At this point the Blue and Red commanders were asked to produce 'estimates' of the situation, including their intentions for the continuation of the manoeuvre. In his estimate the Red commander noted that:

> The Blue fleet has not been able to effect great damage on Red with major gun fire due to the ranges held and Red may safely assume that he has done much damage with his big gun fire….The control of the air by Red is absolute and will have a decided effect on the rest of the battle.…The speed of the two fleets has been reduced and it would appear that Red still enjoys at least a slight superiority in this respect. Blue then, without plane spot is helpless insofar as his major gunfire is concerned….[42]

Red, therefore, elected to, 'Close immediately and press the action, keeping the Blue battle line under maximum effective fire with a view to bringing about his total destruction in the shortest possible time', and he intended 'to adjust course and speed to maintain the range at between 24,000 and 26,000 yards' where his own guns would be effective with air spotting and US guns would be ineffective.[43]

In their assessment, or 'summary' of TAC II-1925 the game staff were highly critical of the performance of Blue, noting that while Red was obliged to reverse course in order to protect its train, without which its objective of establishing a Red naval presence in force in the Caribbean could not be achieved, Blue could be much more selective about when to seek a Mahanian fleet action. In closing to engage in a gunnery exchange the staff noted that Blue

[42] NWC RG12, Box 3, TAC II-1925, 100-102.

[43] NWC, RG12, Box 3, TAC II-1925, 103.

was playing to Red's strength in terms of range and gun power and ignoring the possibility of first operating against the Red train.[44]

The staff accepted the assessment by both Blue and Red of Red's relative superiority over Blue at both the start of the battle and the point when the umpires brought the game to a halt. While the staff felt that Blue should not have closed to engage in the first place, they could not see a solution to the problems of red superiority in gun power, range and speed, once Blue was committed. Essentially they argued that, 'You can't get there – that is victory - from here' so rather than resolve the problem with the navy's current equipment, they reasoned that the US Navy needed to start in a different place with a set of revisions and additions to Navy hardware, which included: improvements in battleship main armament elevation to increase its range, the addition of anti-torpedo bulges on capital ships, increases in capital ship deck armour thickness, increased numbers of light cruisers, the addition of more submarines to the US fleet and the building of several smaller aircraft carriers up the limit imposed by the Washington Naval Conference.[45]

The live-action Fleet Problems involved designing relevant scenarios to represent the kind of war US Navy planners thought they might have to fight in the future, and increasingly throughout the interwar period they assumed that this would most likely be a war with Japan (Orange). For much of the interwar period, American war planners assumed that this would involve a fast thrust across the Pacific and a cataclysmic showdown with the Japanese battle fleet, and this was extensively gamed at the Naval War College.

As the possibility of war with Japan increased, the plausibility of war with Great Britain decreased, yet the Red games persisted at the College. We have suggested reasons for why

[44] NWC RG12, Box 3, TAC II-1925, 104-105.

[45] NWC RG12, Box 3, TAC II-1925, 116

this was so, but Admiral Nimitz and his contemporaries drew the lessons they applied during the Second World War, not just from virtual naval battles with 'Orange' but also from floor games in which the naval forces of 'Red' were represented. In this sense TAC II-1925 was relevant to the clear and present danger from Japan in the same way that some of the Fleet Problems were because it was analogous to War Plan Orange, with the roles reversed. In TAC II-1925 Red's advance across the Atlantic to the waters of the Caribbean was a scaled down version of Blue's fast thrust across the Pacific to Japanese waters, complete with a fleet train, while Blue was actually playing the Japanese role of defending its initial war-time advance.

Indeed, in their summary of TAC II-1925, the War College's game staff quite specifically stated that part of their purpose in playing the game was to test things, including the use of a fleet train, how to deal with relative weakness in gun-power and speed, and whether the two large plane carriers of Blue were superior to the smaller plane carriers of Red. Regarding the last question, the game staff drew the conclusion that lots of smaller carriers were superior to two large ones and recommended building more small carriers up the limit of the Washington Naval Treaty.[46]

It is natural for us to measure the relevance of the Naval War college games by reference to the actual events of the Second World War, where of course, in the Pacific, carrier air power proved the dominant arm, but we need to be cautious about this given that the capabilities of naval aircraft in 1920s were not yet of Second World War standard. It is true that TAC II-1925 was a fleet action a la Jutland, but any criticism of the Mahanian proclivities of the Naval War College game staff must be tempered by the fact that in their assessment they criticised Blue for seeking an immediate fleet action rather than concentrating on the Red Fleet train, which would at least have obliged Red to do all the closing.

[46] NWC RG12, TAC II-1925, 112.

Aviation was critical in TAC II-1925. Even if the emphasis was primarily on aerial spotting for the big guns, a huge aerial battle was fought between Blue and Red, and indeed from an early stage in the inter-war tactical manoeuvres, the clash between the battle fleets was preceded by a longer range duel between both side's aircraft carriers. No carriers were sunk in TAC II-1925 because the naval aircraft of the time could not heft sufficient ordinance to do so, but in the context of the games carriers with inoperative flight decks were as good as sunk. In 1925 Blue and Red may not yet have fully understood carrier aviation as the arm of decision, but it was already becoming so in practice in the games.

Given that numbers of battleships and carriers were fixed by the Washington Treaty, along with battleship main armament, the technological development of carrier aircraft gained increasing significance, to the extent that students could prevail in the wargames by using their carriers to maximum effect in previously non-standard ways. Students could win the game using any means available, and as time passed and improvements in carrier-based aviation were incorporated into the games it became clear that an advantage could be gained from more adventurous use of carriers. The fleets in the games did not mutate into carrier battle groups, but able minds were impressed by the possibilities of carrier attack and when war came it was not a massive mental leap to reach that point, especially in the context of Pearl Harbor, given the Japanese example and the sudden dearth of US capital ships produced by the attack.

Overall, therefore, the Mitchell controversy may or may not have played a pivotal role in the origins of the US Air Force, but it certainly created popular perception of the US Navy in the context of airpower, which was misleading and largely unfair. At no point was the Navy blind to the potential of carrier-based air power and it had absorbed the implications of British research. It had also absorbed the implications of the creation of the RAF and had fought successfully to avoid going the same way. Furthermore, in the Naval War College

wargames, the Navy had inculcated its senior commanders with a familiarity with the potential of carrier airpower that inclined them to naturally adopt strategies in which carrier task forces were the central component while the big-gun behemoths of the battle line were relegated to secondary responsibilities. Thus, among the armed services of the Anglophone powers, the US Navy probably made best use of the technological lessons of that conflict, and while airpower theorists might like to draw a line of causation between Mitchell and Pearl Harbor, it would perhaps be better to consider the Navy's impressive string of carrier based victories in the Pacific war as a representation of the benefits of a learning organisation.

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