

## *Nowhere May They Roam: Ottoman Area-Denial Operations and Lessons for the Strait of Hormuz*

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On March 18<sup>th</sup>, 1915, a combined fleet of British and French battleships attempted to force their way through the Dardanelles, the southern half of the Turkish Straits that connected the Mediterranean with the Black Sea. “Attempted” is the key word, for it was a spectacular failure. Two of the greatest navies in the world had failed to enforce their will upon the puny and seemingly obsolete forces of the Ottoman Empire, sparking the infamous and bloody Gallipoli land campaign.

Nearly a century later to the southeast, the United States Navy (USN) is building up its forces in Persian Gulf.<sup>1</sup> Though never directly admitted, the nature of these forces makes it clear that they are meant to dissuade the Islamic Republic of Iran from following through on its threats to “close” the Strait of Hormuz. Should this fail, those same forces are expected to be able to swiftly end any attempt at following through on that those threats. Commonly viewed as being the world’s most powerful, the USN should easily overpower its Iranian counterpart.

But is that actually the case? One is reminded of the cliché adage that those who do not learn from the past are doomed to repeat it. It is worth considering whether a

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<sup>1</sup> Christopher P. Cavas, “U.S. doubling minesweepers in Persian Gulf,” *NavyTimes*, March 15, 2012, accessed April 10, 2012, <http://www.navytimes.com/news/2012/03/dn-us-doubling-minesweepers-in-persian-gulf-031512/>.

scenario similar to the one the United States may face in the Strait of Hormuz has already occurred in history. An historical comparison may reveal some valuable lessons for America and her allies in the near future. It is in this context that I examine the Ottoman defence of the Dardanelles in World War One. The similarities between that campaign and a potential Iranian attempt at closing the Strait of Hormuz are apparent; both involve a power with a “small” navy trying to prevent a power (or powers) from using its “large” navy to force its way through a narrow waterway. However, there are some differences as well, both in terms of geography and military hardware, which threaten to limit the utility of the comparison.

This paper assesses the extent to which Ottoman area-denial operations in the Dardanelles can provide a rough outline for Iranian actions in the Strait of Hormuz, as well as what the United States and her potential allies can learn from the operations and tactics of the British and French forces. This paper does not intend to state whether or not the US and its allies will be successful, but rather, to indicate some problems that they must be ready to address in order to ensure success. It is split into two main parts: the first examines the details of the Dardanelles campaign as it was conducted by both sides, while the second analyzes the applicability of part one’s conclusions to the modern-day Strait of Hormuz scenario.

The term “area-denial” describes the stage of military operations during which the objective of the defender is to hinder the attacker’s ability to freely operate within a given area of operations. This is in contrast to “anti-access”, in which the defender is trying to keep the attacker from entering the area of operations in the first place. I have chosen to base these definitions on the United States Navy’s *Naval Operations Concept 2010* document, as that institution is the focus of the paper’s analytical segment.<sup>2</sup> For our purposes, the area of operations in the Dardanelles campaign is the Dardanelles itself. Similarly, the area of operations for the discussion in part two will be the Strait of Hormuz. The focus on the waterways does not preclude discussion of the shore and coastal land regions, of course, and both sea and land will be addressed. For the purposes of clarity, the combined German and Ottoman forces in World War I will be

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<sup>2</sup> U.S. Chief of Naval Operations and the Commandants of the U.S. Marine Corps and U.S. Coast Guard, “Naval Operations Concept 2010,” 2010: pp. 55-56.

referred to as simply “the Ottomans” and the joint Anglo-French forces the “Allies” unless otherwise stated.

### **Part One: An Historical Overview**

The end of the 19th century was a tumultuous period for the world naval community. The revolution brought on by the introduction of coal-fired engines and armoured hulls continued to make its effects felt throughout the navies of the world, which adopted these products to differing degrees of success. On one end of the spectrum, those navies which pioneered the new technologies were also the ones in the best position to exploit them to the fullest – for example, the Royal Navy’s (RN’s) continued numerical and technological superiority. On the other end, countries merely receiving the fruits of this revolution found themselves unable to foster the seeds that would allow them to fully profit from it – China, for example, with its advanced but poorly maintained British- and German-built fleet.<sup>3</sup> Furthermore, the quick pace of developments during this period meant that ships were often made obsolete soon after their completion. Some countries, such as Japan, were more fortunate and fell in the middle of the continuum as they gradually shifted from foreign purchases to indigenous production, keeping up with the technology curve.<sup>4</sup>

Like Imperial China, the Ottoman Empire’s industrial capabilities in the 1800s were primitive, requiring the purchase of advanced engines and cannons from the British while hiring foreign trainers to help maintain those acquired products.<sup>5</sup> This was insufficient, however, and the dismal performance of the Ottoman Navy (Osmanlı Donanması) in the 1897 Greco-Ottoman War, when sailors took over two hours to load and aim an Armstrong gun<sup>6</sup>, finally convinced Sultan Abdülhamid to invest in a

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<sup>3</sup> Bruce Elleman, “China’s New ‘Imperial’ Navy,” *Naval War College Review* 55, no.3 (Summer 2002): pp. 146-147.

<sup>4</sup> Kozo Yamamura, “Success Illgotten? The Role of Meiji Militarism in Japan’s Technological Progress”, *The Journal of Economic History* 37, no. 1 (March 1977): pp. 120-121.

<sup>5</sup> Bernd Langensiepen and Ahmet Güleriyüz, *1828-1923 Osmanlı Donanması The Ottoman Navy 1828-1923*, trans. James Cooper and Renan Mengü (Istanbul: Denizler Kitabevi, 2000), pp. 60-61.

<sup>6</sup> “Turkey’s Bad Navy,” *New York Times*, November10, 1889, p. 16.

modern fleet. Sourcing from Italian, American, French, and British shipyards,<sup>7</sup> a reliable new fleet of destroyers, torpedo boats, and a pair of protected cruisers was acquired relatively cheaply.<sup>8</sup> This fleet was augmented in 1910 by two German *Brandenberg* class predreadnoughts, as well as a few more destroyers.<sup>9</sup>

It was this fleet with which the Ottoman Navy entered the First World War. Though she almost acquired two British-built state-of-the-art dreadnoughts, the imminent outbreak of war caused their commissioning under RN service as HM Ships *Agincourt* and *Erin*. This caused “bitter indignation” and increased the likelihood that the Empire would join the war on the side of the Central Powers.<sup>10</sup>

Nonetheless, the Ottomans, through a *fait accompli* of Ottoman minister of war Enver Paşa, managed to secure their own dreadnought.<sup>11</sup> Though the mid-August handover of the battlecruiser *Goeben* (later renamed *Yavuz*) and protected cruiser *Breslau* (renamed *Midilli*) was free for the Ottomans in the immediate financial sense, this singular action would contribute significantly to bringing the Ottomans onto the side of the Central Powers and all the costs that decision would eventually incur. With a navy as small as the Ottoman’s, this appeared to be a cost it could ill-afford – chances appeared low the Osmanlı Donanması could challenge, never mind defeat, any of the enemy powers in the coming war. As it turned out, however, the Ottoman Navy would not act alone in this endeavour.

### *The Dardanelles Campaign*

The overall military objective of the Allies was to bring Constantinople within range of their naval guns (but not to actually bombard the city).<sup>12</sup> This would hopefully

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<sup>7</sup> Sir Edwin Pears, *Forty Years in Constantinople 1873-1915* (New York: D. Appleton and Company, 1916), p. 172.

<sup>8</sup> Langensiepen and Güleriyüz, *The Ottoman Navy*, pp. 64-65; “Turkish Cruiser Rushed,” *The Washington Post*, February 22, 1904, p. 3.

<sup>9</sup> Langensiepen and Güleriyüz, *The Ottoman Navy*, p. 67.

<sup>10</sup> Chris B. Rooney, “The International Significance of British Naval Missions to the Ottoman Empire, 1908-14,” *Middle Eastern Studies* 34 (January 1998): pp. 23-24.

<sup>11</sup> Robert K. Massie, *Castles of Steel* (New York: Ballantine Books, 2003), pp. 48-50.

<sup>12</sup> Robin Prior, *Gallipoli: The End of the Myth* (London: Yale University Press, 2009), p. 42.

convince the Ottomans to cease supporting Germany. An Ottoman surrender would, in theory, encourage the undecided Balkan states to side with the Allies. Opening the Turkish Straits would also re-enable trade between Russia and the Western allies. This is consistent with Britain's historical strategy of using her sea power to attack the enemy at vulnerable points away from the primary battlefield (i.e. France).<sup>13</sup> The impetus for the Dardanelles campaign was initially the desire to assist Russia, facing difficulties in the Caucasus against Ottoman troops. Winston Churchill, then the First Lord of the Admiralty, became enamoured of the mental image of a line of RN battleships sailing up the Dardanelles to hold Constantinople hostage.<sup>14</sup> This certainly sounded easy – after all, how could the tiny and outdated Ottoman fleet resist the combined might of the British and French navies? Yet, the Ottomans had one ace up their sleeve: geography.

The direct distance from the northeastern-most point of the Aegean Sea to Constantinople is over 180 kilometers, far beyond the capabilities of naval rifles; even the famous *Hood's* unique 15" Mk. II gun mounts could only fire some twenty-seven kilometers.<sup>15</sup> Only by reaching the Sea of Marmara via the Dardanelles could Allied guns be brought to bear on The City.

Two major obstacles prevented the Allies from reaching the Sea of Marmara: naval mines and the fortresses that lined the Dardanelles on either side. Together they made it extremely challenging for an enemy fleet to successfully sail through the Strait. However, as Churchill saw it (though Lord Fisher and other officers were less optimistic<sup>16</sup>), it was simply a matter of reducing the forts using naval artillery and then sending in minesweepers to clear a path for the fleet. Churchill was especially inspired by the Germans' ability to silence the great modern Belgian forts with land howitzers in a matter of days.<sup>17</sup> If those guns, so puny compared to the great battleship rifles, could do it, then why not the Royal Navy against the ancient Turkish *kaleler* and *hisarlar*, the

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<sup>13</sup> Paul G. Halpern, *A Naval History of World War I* (Annapolis: Naval Institute Press, 1994), pp. 109-110.

<sup>14</sup> Massie, *Castles of Steel*, pp. 431-433.

<sup>15</sup> John Roberts, *Anatomy of the Ship: The Battlecruiser Hood* (London: Conway Maritime Press, 2001), p. 16.

<sup>16</sup> Halpern, *A Naval History of World War I*, p. 111.

<sup>17</sup> Massie, *Castles of Steel*, pp. 435-436.

castles and fortresses?<sup>18</sup> However, the Clausewitzian “fog of war” has always plagued military conduct, and this situation was no different: the following pages make it clear that it was the small mobile howitzers lining the Dardanelles that, combined with the mines, played the greatest role in stopping the Allied fleet.

February 19, 1915, was the beginning of the Allies’ sustained attempt at forcing through to Constantinople. Aimed at reducing the outer fortifications that guarded the entrance to the Dardanelles, the first day’s bombardment proved inclusive: Kumkale and Seddülbahir on the Asian and European shores, respectively, remained active despite receiving 140 twelve-inch shells.<sup>19</sup> The massive clouds of dust kicked up by exploding shells greatly impaired the fleet’s ability to accurately target individual guns – necessary since fortresses cannot sink and take their guns with them. Not even aerial spotting from airplanes and balloons resolved this problem.<sup>20</sup> The second day of the attack on the 25<sup>th</sup> was more effective - one group of battleships moved closer to employ their more numerous secondary guns while another provided cover fire from afar. After several hours, the ships retired and next day, the forts’ guns were silent and a white flag was spotted at the top of a minaret; demolition parties would be sent over the next few days to ensure the guns’ permanent destruction.<sup>21</sup>

Although the landing parties approached the shores with no problems, they did meet significant resistance once landed. This was especially the case on March 4<sup>th</sup>: snipers fired upon the landing parties while concealed in village ruins and cemeteries. Midshipman Denham recalled that enemy infantry were also “spotting from windmills and the church” at Yenişehir village near Kumkale, resulting in those structures being targeted by the battleships.<sup>22</sup> Throughout this amphibious action, mobile artillery fired upon the land parties, preventing them from permanently securing the forts.<sup>23</sup>

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<sup>18</sup> George H. Cassar, *The French and the Dardanelles: A Study of Failure in the Conduct of War* (London: George Allen & Unwin Ltd, 1971), p. 45.

<sup>19</sup> Massie, *Castles of Steel*, p. 446.

<sup>20</sup> H.M. Denham, *Dardanelles: A Midshipman’s Diary 1915-16* (London: John Murray Ltd, 1981), p. 26.

<sup>21</sup> Denham, *Dardanelles*, p. 38.

<sup>22</sup> *Ibid.*, p. 46.

<sup>23</sup> Trumbull Higgins, *Winston Churchill and the Dardanelles: A Dialogue in Ends and Means* (New York: The Macmillan Company, 1963), p. 147.

Nevertheless, the objective of the first phase of the Dardanelles campaign was complete. The outer forts and their guns had been taken out of action, allowing Allied ships to safely sail into the Dardanelles itself. With less than a hundred casualties thus far, spirits ran high in London. Admiral Carden, commanding the fleet off the Straits, expected victory within two weeks.<sup>24</sup>

Yet, the rapidity with which the Ottomans were driven from the outer forts was perhaps less due to the efficacy of the bombardment and more to do with their defence strategy. Kumkale and Seddülbahir were not meant to be the only line of defence. Should they fail, there were still the “inner forts” located at the Narrows – where the Dardanelles is less than 1500 meters wide and the Ottomans concentrated their naval mines.

The minefields that blocked the Narrows were comprised of ten lines, each perpendicular to the long axis of the Dardanelles. Totalling 377 mines laid between August 1914 and March 1915, this was the barrier the Allies faced when minesweeping operations began. The mines were laid by the three minelayers responsible for the Dardanelles region: *Selanik*, *İntibah*, and *Nusret*.<sup>25</sup> *Selanik* and *İntibah* were built as tugboats but refurbished into minelayers shortly before the war. *Nusret* was built in Germany from the outset as a minelayer and was marginally faster.<sup>26</sup> From the beginning of March to the 18<sup>th</sup>, the Allies made repeated attempts at clearing the minefields – all failed.

The primary reason was the vulnerability of minesweepers to gunfire, as they were merely fishing trawlers fitted with minesweeping gear. Though “steel plate protection...saved many lives”, they could not protect the exposed kites, wires, and winches.<sup>27</sup> Worse, their weak engines allowed them to go no more than 3 knots relative to land: the strong southward currents of the Dardanelles made them nearly stationary targets. Thus, the trawlers were easily driven off by the howitzers lining the shores.

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<sup>24</sup> Massie, *Castles of Steel*, p. 448.

<sup>25</sup> Piotr Nykiel, “Minefield in the Dardanelles (August 4, 1914-March 9, 1915),” <http://www.navyingallipoli.com/teksty/mines.pdf>.

<sup>26</sup> Langensiepen and Güleriyüz, *The Ottoman Navy*, p. 233.

<sup>27</sup> Admiral of the Fleet Lord Keyes, “66. Keyes to his wife,” in *1914-1918*, ed. Paul G. Halpern, vol. 1 of *The Keyes Papers: Selections from the Private and Official Correspondence of Admiral of the Fleet Baron Keyes of Zeebrugge* (London: George Allen & Unwin, 1979), p. 106.

These guns, though weaker than those at the Narrows' fortresses, were especially effective against the civilians operating the trawlers.<sup>28</sup> While many had minesweeping experience on the North Sea coast of Britain, that setting did not expose crews to gunfire and they were therefore unprepared for what they faced in the Dardanelles.<sup>29</sup> This caused them to turn back on numerous occasions before even reaching the mines. This attitude towards taking fire was ameliorated to some extent by placing Royal Navy sailors onboard the minesweepers, boosting the morale of the civilians. The co-employment of RN battleships bombarding the forts also contributed to this, despite the forts not being the primary sources of gunfire.<sup>30</sup> Eventually, the trawler crews were persuaded to sail on in the face of danger.

However, while human bravery can be induced with extrinsic encouragement, such is not the case with the forces of Mother Nature. The Dardanelles current's effect on making the trawlers easy targets for shore guns has already been mentioned. Nonetheless, the historical record indicates that hitting the small trawlers was not a very easy task, especially at night when nearly all minesweeping operations took place.<sup>31</sup> Although the Ottomans had many powerful searchlights to illuminate the targets, the lighting was very concentrated, likely making it difficult for gunners to see where their shell splashes were in the surrounding darkness. So the trawlers had a fairly reasonable chance of getting to the minefields as long as they kept going forward. But once they reached the mines, the persistent current again made itself known. With a total forward speed of no more than 2-3 knots, the trawlers could not apply enough force upon the mines' mooring cables; the mines could not be dragged up to the surface and be neutralized. The solution was to sweep *with* the current, using the trawlers' full speed of 6 knots plus the Dardanelles' 4-knot current to apply the necessary pressure.<sup>32</sup>

But sweeping with the current presented a corollary problem: increased gunfire exposure. The minesweepers had to first go past several lines of mines before turning around with the current, bringing them closer to the fortress artillery. An attempt on the

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<sup>28</sup> Massie, *Castles of Steel*, p. 451.

<sup>29</sup> *Ibid.*, pp. 450-451.

<sup>30</sup> Piotr Nykiel, "Minesweeping Operations in the Dardanelles (February 25 – March 17, 1915)," <http://www.navyingallipoli.com/teksty/minesweeping.pdf>, p. 3.

<sup>31</sup> Massie, *Castles of Steel*, pp. 451-453.

<sup>32</sup> Lord Keyes, "66, Keyes to his wife," pp. 106-107; Robin Prior, *Gallipoli*, p. 35.

night of March 13 saw delicate minesweeping gear blown away by near-misses; another trawler had all of its above-decks crew killed, including the captain; and two of the trawlers, amidst the confusion of exploding shells and dazzling searchlights, collided and remained stuck as they floated through the minefields. Surprisingly, none of the trawlers used that night were sunk, though the damage was sufficient to put many out of action for the remainder of the campaign.<sup>33</sup>

Almost all sweeping attempts took place at night, when it was hoped the trawlers would be more difficult to detect and target. However, the searchlights along the Narrows minimized the usefulness of this tactic. Not only did these light up the trawlers for artillery fire, they also blinded the trawler crews, whose eyes had been accustomed to darkness during the trip up to the minefields. It became obvious that the searchlights had to be taken out, and the only way to do so would be by bombardment. Thus, the March 13 attempt also involved the cruiser *Amethyst* shelling from outside the minefields. However, the difficulty in destroying searchlights echoes that of destroying the fortress guns: the lights themselves had to be destroyed with a direct hit and anything less would be insufficient. Although lenses were shattered and electric cables severed, these were easily repaired or replaced by the next night.<sup>34</sup> *Amethyst* paid for her actions with a hit resulting in sixty casualties<sup>35</sup> – another stark reminder that the Ottomans and their outdated equipment would not be so easily defeated.

The attempt on the 13<sup>th</sup> persuaded Admiral Carden that nothing short of a comprehensive bombardment of the forts and flanking artillery before sending in the minesweepers would be sufficient. Thus the planning began for the great concentrated attack on the Narrows. The entire fleet of Allied battleships would take turns bombarding the inner forts until the minesweepers could take advantage of the forts' state of distraction to conduct their sweeps. This operation had to take place during daylight, as it would be impossible to conduct accurate fires at night.

So it was that on the morning of March 18, 1915, the superdreadnought *Queen Elizabeth* led the battlecruiser *Inflexible* and the two newest predreadnoughts, *Agamemnon* and *Lord Nelson*, into the Dardanelles. They formed Line A, responsible for

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<sup>33</sup> Lord Keyes, "66. Keyes to his wife," p. 107; Massie, *Castles of Steel*, p. 453.

<sup>34</sup> Piotr Nykiel, "Minesweeping Operations in the Dardanelles," p. 8.

<sup>35</sup> Lord Keyes, "66. Keyes to his wife," p. 107; Massie, *Castles of Steel*, p. 454.

suppressing the forts from long range. The four French predreadnoughts (*Gaulois*, *Charlemagne*, *Bouvet*, *Suffren*), curved tumblehome hulls standing out in odd contrast to their British counterparts, formed Line B. They would take up the vanguard and attack the forts from close range once Line A has sufficiently suppressed the fortress guns. A third line (Line C) of four old British predreadnoughts would sit near the entrance of the Dardanelles to be ready to relieve the French. To protect Lines A and B from mobile howitzers, a predreadnought was assigned to each side of those lines.<sup>36</sup>

The guns of the battleships, forts, and howitzers reverberated through the Dardanelles in a great cacophony celebrating mankind's deadliest creations to date. Not for nothing were battleships called "castles of steel" – despite multiple hits on every vessel by noon, "there were fewer than twenty casualties."<sup>37</sup> Though the decks of the predreadnoughts had not been built to withstand plunging fire from other battleship guns, they were adequate against the 6" and smaller howitzers that lined the shores. Meanwhile, their heavy belt armour protected them from the forts' larger guns. However, some crucial areas of the ships were not armoured, such as the fire control stations high up on the masts and the bridge. *Inflexible's* forward spotting top, for example, was perforated and her bridge had caught on fire.<sup>38</sup>

It was the French, however, who suffered the most disproportionately on the 18<sup>th</sup>. At 12:30 pm, *Gaulois* suffered an underwater hit near the bow by a fortress shell. With her hawsepipe nearly at the waterline, she left the Dardanelles, beaching on a small island in case she took on more water than could be handled. But the greatest tragedy occurred ninety minutes later, when Line C relieved Line B. The remaining three French ships turned to starboard, *Suffren* leading the way. As they passed Line A, *Bouvet*, second in line, struck a mine. A big cloud of smoke poured from her funnels as she continued to move forward, rolling onto her side. In less than two minutes, she had

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<sup>36</sup> Admiral of the Fleet Lord Keyes, "69. Keyes to his wife," in 1914-1918, ed. Paul G. Halpern, vol. 1 of *The Keyes Papers: Selections from the Private and Official Correspondence of Admiral of the Fleet Baron Keyes of Zeebrugge* (London: George Allen & Unwin, 1979), p. 111.

<sup>37</sup> Massie, *Castles of Steel*, p. 460.

<sup>38</sup> Lord Keyes, "69. Keyes to his wife," p. 111.

capsized and took with her 640 men, including the captain.<sup>39</sup> In less than two hours, half the French fleet had been removed by enemy action.

The deadly mines claimed three more ships before the day was over. *Inflexible* suffered a strike to her bow that drowned twenty-nine crewmen, though she did not sink. Predreadnoughts *Irresistible* and *Ocean* each struck a mine, causing their abandonment by their crew as Ottoman guns easily peppered the ships' decks – the two ships sank later that evening before they could be recovered.<sup>40</sup>

To add insult to this grievous injury, a failed attempt at sweeping the Narrows' mines occurred shortly before *Inflexible's* mining. Though the fortress guns were silent, the shore howitzers and small guns were not; the trawlers were again driven off with only three mines swept for their trouble.<sup>41</sup>

But from where did the mines that so heavily injured the Allied fleet come? After all, the fleet had been operating in the Dardanelles for the last several weeks without incident. As it turned out - and it was not known until after the war – August 8 saw *Nusret* enter the Dardanelles. She carried with her a load of 26 mines, with which she laid Line 11 of the Dardanelles minefields. Unlike the ten lines blocking the Narrows, this one was placed parallel to the shoreline at Erenköy Bay, the large indent making up most of the Asiatic coast before the Narrows. The Allies, having already swept this location several days earlier, did not think the Ottomans would be so brazen as to construct another minefield right under their watch. Although minesweepers found and caught up to seven mines on March 15/16, the crews did not note their location and little thought was given to the event.<sup>42</sup> One last chance for the Allies to find Line 11 was offered when seaplanes conducted a reconnaissance flight prior to the attack on the 18<sup>th</sup> – nothing was reported. Given their ability to spot mines down to eighteen feet in the trial waters of the Aegean, it was assumed that the planes would perform similarly in the Dardanelles as well – an erroneous assumption.<sup>43</sup>

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<sup>39</sup> Ibid., 112; Massie, *Castles of Steel*, p. 461. For images of *Bouvet's* sinking, see photographs 37 and 38 in Denham, *Dardanelles*, p. 62.

<sup>40</sup> Lord Keyes, "69. Keyes to his wife," pp. 112-115; Massie, *Castles of Steel*, pp. 462-463.

<sup>41</sup> Lord Keyes, "69. Keyes to his wife," p. 112; Massie, *Castles of Steel*, p. 461.

<sup>42</sup> Nykiel, "Minesweeping Operations in the Dardanelles," p. 11.

<sup>43</sup> Halpern, *A Naval History of World War I*, p. 115; Massie, *Castles of Steel*, p. 462.

Thus it was that the great naval attack on the Narrows ended with a third of the Allied fleet disabled. In return, practically nothing substantive of the Ottoman defences was destroyed. The Dardanelles operation was supposed to be the dynamic success that would lift up the heart of a nation tired of the bloody stalemates on the Western Front.<sup>44</sup> Alas, it, too, turned out to be a futile endeavour. The paramount obstacles facing the Allies were the mobile howitzers, which so effectively drove off the minesweeping trawlers. Hiding behind hills and gullies, they fired at the ships with near-impunity. The only way to destroy the howitzers would be by ground troops, hence the great Gallipoli land campaign.

Though primarily a land action, the Gallipoli campaign did see the Allies employ their battleships for gunfire support. This provided the Ottomans with some opportunity to conduct further area-denial activities, the most spectacular being the torpedoing of the battleship *Goliath* on May 13, 1915. With cover fire from the shore providing adequate distraction, the Ottoman destroyer *Muavenet-i Milliye* launched three German Schwarzkopf torpedoes, causing *Goliath* to promptly capsize and sink within minutes. *Muavenet-i Milliye* managed to get away amidst the confusion and her crew was well-awarded with gold and watches.<sup>45</sup> Torpedoes would cause the death of two more predreadnoughts: *Triumph* and *Majestic* were sunk within days of each other by torpedoes launched from German submarines, despite countermeasures such as anti-torpedo nets.<sup>46</sup>

Here we conclude the first part of the paper on the Ottoman defence of the Dardanelles against the combined British and French forces. It should be noted that this wasn't the only example of area-denial operations being applied to a narrow waterway by the Ottomans – the combination of forts, mobile guns, and mines were also used against the Russians on the Bosphorus, though the Black Sea Fleet never attempted to “force” that strait. However, one element that differed was the practice of offensive mining: mines were used to keep the enemy in their ports – the Ottomans laid mines

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<sup>44</sup> Lisle A. Rose. *The Age of Navalism, 1890-1918*, vol. 1 of *Power at Sea* (Columbia: University of Missouri Press, 2007), p. 210

<sup>45</sup> Halpern, *A Naval History of World War I*, 117; Massie, *Castles of Steel*, 483-484; Langensiepen and Gülerüz, *The Ottoman Navy*, p. 74.

<sup>46</sup> Halpern, *A Naval History of World War I*, p. 118; Massie, *Castles of Steel*, pp. 492-493; R.A. Burt, *British Battleships of World War One* (London: Arms and Armour Press Limited, 1986), p. 15.

outside Sevastopol while the Russians laid mines outside the Bosphorus (amongst other places).<sup>47</sup> Other innovative tactics were employed, especially by the Russians – laying mines via submarine and heavy use of aircraft, for example.<sup>48</sup> Despite these interesting practices, we will not examine the Black Sea conflict much further as the nature of it deviates too much to be of overall use to this paper; however, some elements of the northern conflict do have parallels and will be brought up as relevant.

## **Part II: Parallels between the two cases**

One enduring question in modern strategic studies is whether strategic concepts are applicable regardless of time period, or whether technology can change so drastically that strategy is dependent on the tools available to the user. This section of the paper will provide some perspective with empirical examples at strategic, operational, and tactical levels.

In the event that the Iranian government decides to close the Strait of Hormuz to seaborne traffic, it can be expected that this would be done, in part, via the deployment of numerous mines in the water way. Since the end of World War II, 70% of United States Navy ship casualties have been due to mines: victims range from minesweepers to guided-missile cruisers and amphibious assault ships.<sup>49</sup> As mines were also the principle cause of death for the Allied fleet in the Dardanelles, it is appropriate the examination begins with them.

Modern mines differ from those used in the Dardanelles in a variety of ways, but the most distinctive would be triggering methods. The mines used in the Turkish Straits were simple devices that, anchored to the seafloor, exploded upon contact with an object that broke any of the buoyant section's many protrusions, each triggering the

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<sup>47</sup> Nekrasov, *North of Gallipoli*, pp. 24-25, 36, 106.

<sup>48</sup> *Ibid.*, pp. 62, 126.

<sup>49</sup> U.S. Navy, "21<sup>st</sup> Century U.S. Navy Mine Warfare: Ensuring Global Access and Commerce," June 2009, p. 8.

explosive fuse. Neutralizing these required “sweeping” the entire mine assembly off the ocean floor and blowing them up once the buoyant component was at the surface.<sup>50</sup>

Today, “influence” mines are widely available. Unlike contact mines, these do not require physical contact, drastically decreasing the number of mines needed to deny an enemy fleet navigational freedom. Fuse triggers include magnetic, acoustic, and pressure-sensitive. While magnetic mines can be countered by degaussing metal ships and building mine-countermeasures vessels out of wood and fiberglass, acoustic and pressure-sensitive mines are less easily eluded.<sup>51</sup> Advancements in electronics have made it possible to build mines that explode only when ships matching prerequisite signatures pass by: an acoustic mine can be set so it only blows up when it hears an aircraft carrier instead of being “wasted” on a minesweeper and prematurely warning the enemy to the presence of mines.<sup>52</sup> To complicate mine-clearing activities, modern mines can be positioned on or under the seafloor. These cannot be swept in the manner of bottom-moored mines and thus require a tedious process involving remotely-operated vehicles (ROVs), trained marine mammals/divers, and/or sweeps that emit influence signatures. Even more innovative are moored mines that contain a small guided torpedo, further increasing lethality.<sup>53</sup>

It has thus become necessary for modern mine countermeasures (MCM) to be more cautious and complicated than in the past. This significantly affects the following analyses. The paper will now examine the parallels between mine-hunting today and in World War I.

### *Currents*

One of the main obstacles the Dardanelles minesweepers encountered was the 4-knot current running down the Dardanelles that prevented them from sweeping the mines. Today, currents in the Strait of Hormuz would not be sufficient to immobilize a

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<sup>50</sup> Piotr Nykiel, “Mines,” *Naval Operations in the Dardanelles 1915: by Piotr Nykiel, PhD*, <http://www.navyingallipoli.com/miny.html>.

<sup>51</sup> U.S. Navy, “21<sup>st</sup> Century U.S. Navy Mine Warfare,” p. 10.

<sup>52</sup> *Ibid.*, p. 10.

<sup>53</sup> *Ibid.*, pp. 8-10.

14-knot *Avenger* class MCM ship, the only vessel in the USN currently dedicated to mine-clearing.<sup>54</sup> However, as noted above, some modern mines can harm the minesweeper if sweeping is attempted (for example, an acoustic mine set to explode upon hearing an *Avenger's* engines). Thus, today's mine-clearing methods are less about sweeping in a large ship than about hunting and neutralizing via Unmanned Underwater Vehicles, or UUVs.<sup>55</sup>

Strait of Hormuz currents have been measured to be as high as 4.8 knots, though it varies significantly depending on time of year, depth, and exact location in the Strait.<sup>56</sup> One UUV employed for destroying mines is Atlas Elektronik's SeaFox, used by most European navies and entering service with the USN. Essentially a small torpedo, it locates and identifies enemy mines by sonar, swims up to one, and explodes, destroying itself and the mine. However, it only has a maximum speed of 6 knots.<sup>57</sup> Against a current of 4.8 knots, a SeaFox cannot expect to make much headway. Two consequences follow: firstly, the SeaFox's operational range is significantly reduced and secondly, because of that reduced range, the MCM ship deploying the SeaFox will have to sail much closer to a suspected minefield, exposing it to greater danger.

For the USN, SeaFox is an interim solution until Raytheon's Airborne Mine Neutralization System (AMNS) enters service. The AMNS consists of four Archerfish neutralizers, which operate nearly identically to SeaFox – even the maximum speed is the same. However, being much smaller than SeaFox, the Archerfishes are expected to deploy from the ubiquitous SH-60 shipboard helicopters.<sup>58</sup> It thus improves upon the SeaFox as MCM ships of the future (i.e. MCM mission package-equipped Littoral Combat Ships) will not have to be near a minefield at all since the helicopter can operate

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<sup>54</sup> "Mine Countermeasures Ships – MCM," *Navy.mil*, last modified November 10, 2011, [http://www.navy.mil/navydata/fact\\_display.asp?cid=4200&tid=1900&ct=4](http://www.navy.mil/navydata/fact_display.asp?cid=4200&tid=1900&ct=4).

<sup>55</sup> U.S. Navy, "21<sup>st</sup> Century U.S. Navy Mine Warfare," pp. 13, 16.

<sup>56</sup> "Fujairah, UAE: Currents and Tides," last modified February 2006, <http://www.nrlmry.navy.mil/medports/mideastports/Fujairah/index.html>; Prasad G. Thoppil and Patrick J. Hogan, "On the Mechanisms of Episodic Salinity Overflow Events in the Strait of Hormuz," *Journal of Physical Oceanography* 39(6): p. 1348.

<sup>57</sup> "SeaFox C," *Atlas Elektronik*, last accessed September 2, 2012, <http://www.atlas-elektronik.com/en/systemsproducts/uuv-auvrov/seafox-c/>.

<sup>58</sup> "AN/ASQ-235 Airborne Mine Neutralization System (AMNS)," *Raytheon*, last modified May 16, 2008, [http://www.raytheon.com/businesses/rids/businesses/scs/www.raytheon.com/businesses/rtnwcm/groups/public/documents/content/rtn\\_bus\\_ids\\_prod\\_amns\\_pdf.pdf](http://www.raytheon.com/businesses/rids/businesses/scs/www.raytheon.com/businesses/rtnwcm/groups/public/documents/content/rtn_bus_ids_prod_amns_pdf.pdf).

far away from its mothership. Nonetheless, once in the water, the Archerfish must be sufficiently powerful to get to the mine itself in the face of possible currents – the “need for speed”, as it were, remains.

But this need will be difficult to address. At a 2012 maritime security conference in Victoria, B.C., Canada, the author had the opportunity to meet a defence research scientist who specialized in unmanned vehicles. When asked about whether there were any attempts to increase the speed of MCM UUVs, she replied that current battery technology does not allow for such increases. It was mentioned that the United States’ Naval Research Laboratory is working on a new hydrogen-based power source but until that is operational, UUVs for the foreseeable future will be unable to move any faster than the Dardanelles trawlers.

But regardless of the speed problem, MCM forces still have to know the general location of minefields before they can conduct a precise search to neutralize them. A side benefit of gaining such knowledge is that MCM forces may be able to find optimal deployment zones for UUVs that minimize the impact of currents – one solution to the speed problem suggested by the abovementioned scientist. This will be the focus of the next examination.

### *Locating Minefields*

The deadly mines laid by *Nusret* were not spotted in the run-up to the March 18 operation despite aerial reconnaissance efforts. Pilots were expected to be capable of seeing at least eighteen feet below the water’s surface. The logical conclusion would be that the waters of Erenköy Bay were less transparent than those in the Aegean where the eighteen feet benchmark was set, or that the mines laid were deeper than eighteen feet.

The lesson should be obvious: never take for granted that sea conditions in one area will be the same as another, even if they are only a short distance away. The waters in one area may be murkier than another, or the surface of the water will be choppier, distorting the view to the bottom. Perhaps even the sun’s reflections on the water are more dazzling in one location versus another (not to mention variance due to time of

day and year), hindering the observer's ability to see clearly. These precautions are especially relevant for optics-based detection methods, such as the United States' helicopter-borne Airborne Laser Mine Detection System (ALMDS).<sup>59</sup>

Current and upcoming mine-hunting technologies will have to address the behaviour of water bodies in order to reach their full potential. UUVs will have to be powerful enough to maneuver even in the strongest of currents while the ALMDS will have to be made to compensate for various oceanic conditions. When the USN's second International MCM Exercise gets underway in May 2013, international forces will have the opportunity to learn just how much the Strait of Hormuz's natural conditions can affect MCM equipment, and revise accordingly.<sup>60</sup>

The airborne nature of future mine-clearing practices also has a weakness in itself. Just as reconnaissance planes at the Dardanelles were easily threatened by anti-aircraft artillery (*Ark Royal* lost the use of three out of her five seaplanes by March 8<sup>th</sup>, 1915<sup>61</sup>), so are helicopters. The slow and methodical nature of counter-mine operations make helicopters easy targets: they must be given adequate protection by other assets.

There is also the crucial operational lesson rendered by *Nusret*'s March 8<sup>th</sup> laying: it should never be assumed an area of water will remain permanently free of mines. Areas must to be continuously checked before any ship goes through. Any hint of mines should deserve a full and comprehensive MCM effort to ensure that there are no more in waiting. Hand-in-hand with this is recognizing the enemy will note which areas see the most repeated use. After all, it was only after observing the battleships operating in Erenköy Bay that the Ottomans knew to send *Nusret* there.

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<sup>59</sup> "LCS & MH-60S Mine Counter-Measures Continue Development," *Defense Industry Daily*, April 5, 2012, accessed September 3, 2012, <http://www.defenseindustrydaily.com/mh60s-airborne-mine-countermeasures-continues-development-01604/>.

<sup>60</sup> U.S. Central Command, "International Militaries Return to Gulf to Conduct Mine Countermeasures Exercise," *United States Central Command*, last modified February 4, 2013, <http://www.centcom.mil/press-releases/international-militaries-return-to-gulf-to-conduct-mine-countermeasures-exercise>.

<sup>61</sup> Denham, *Dardanelles*, p. 53.

*Beyond MCM*

There are further warnings to be interpreted from the Ottoman and Russian mining efforts in the Black Sea. The USN and its allies in the Persian Gulf should be concerned about “offensive mining”. Just as the Ottomans and Russians laid mines in each other’s harbours, we can reasonably suspect that Iran will conduct similar operations against Manama harbour, home of the US Fifth Fleet. The Russians’ *ad hoc* conversion of *Elpidifor* class transports into minelayers, their tactic of transporting small boats via larger ships to lay mines in shallow waters, and use of submarine minelayers should not be forgotten.<sup>62</sup> Any vessel, large or small, purpose-built or converted, can be a minelayer. Though the Iranians have already been known to lay mines in international waters using *ad hoc* vessels (i.e. *Iran Ajr* during the 1980s), the Russian examples suggest that covert minelayers may well operate inshore, close to basing areas: the USN and its allies should be on the alert for any kind of vessel, regardless of its appearance and location. Furthermore, the threat of Iran’s numerous submarines should be viewed not just in terms of their conventional role as torpedo-launchers, but also as minelayers.

Conversely, the USN and its allies may find it useful to conduct their own mining operations. Although likely to be politically unpopular, the fact that the Russians were able to end the German submarine menace decisively in 1916 by placing anti-submarine mines (“rybki”) in the Bosphorus and other Ottoman ports points to the tactic’s effectiveness.<sup>63</sup> With the numerous small submarines that Iran is purported to have<sup>64</sup>, a blockade of Iranian ports with small mines set to explode if Iranian submarine signatures are met may well be an excellent defence against them. However, the USN has not used mines for quite some time and it will take a while before proficiency in counter-submarine mining operations can be achieved.<sup>65</sup>

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<sup>62</sup> Nekrasov, *North of Gallipoli*, pp. 117, 125-126.

<sup>63</sup> *Ibid.*, pp. 115, 125.

<sup>64</sup> Senior Intelligence Officer – Iran, *Iran’s Naval Forces: From Guerilla Warfare to a Modern Naval Strategy*, (Declassified report, Office of Naval Intelligence, Fall 2009), pp. 17-18, 24.

<sup>65</sup> U.S. Navy, “21<sup>st</sup> Century U.S. Navy Mine Warfare,” pp. 25-26.

*Other lessons to be learned*

There was, of course, much more that contributed to the Allies' failure than just the mines. Perhaps the most noteworthy were the mobile howitzers.

Portable, well-hidden, and well-protected, mobile howitzers played a decisive role in preventing successful sweeps of the Dardanelles mines. Is there a parallel weapon today that might achieve the same effect?

The most obvious comparison would be modern howitzers. Iran is known to possess 155mm howitzers with a range of 30 kilometres.<sup>66</sup> However, the distances involved in the Strait of Hormuz are much greater than those in the Dardanelle: the narrowest point is approximately 53 kilometres wide, compared to just 1.5 km at the Narrows. Thus, although Iran's artillery can fire much farther than the Ottomans', geography prevents them from being as effective. Furthermore, the time required to set up most modern howitzers in quantities sufficient to reliably destroy a moving naval target makes them vulnerable to air attack. It would be nigh-impossible to hide the deployment of large amounts of artillery batteries from overhead surveillance vehicles. Unlike the reconnaissance aircraft used in the Dardanelles, armed drones can both spot and attack mobile targets with great accuracy from directly above, nullifying mobile artillery's ability to hide behind earthworks in the manner of the First World War.

A weapon system that is a better functional parallel is the anti-ship cruise missile (ASCM). Shore-based ASCMs can easily reach across the width of the Strait of Hormuz; unlike the old fortress cannons, however, many ASCMs can be carried and deployed from mobile carriages<sup>67</sup>, allowing them to have both the long-range advantage of the old forts and the mobile capabilities of the howitzers. Unlike howitzers, ASCMs are guided and thus far fewer are needed to destroy a target, greatly decreasing their need for concentration. This allows them to be more easily hidden than a battery of modern

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<sup>66</sup> "DIO 155mm 39-calibre HM41 howitzer (Iran), Towed anti-tank guns, guns and howitzers," *Jane's*, last modified March 1, 2012, <http://articles.janes.com/articles/Janes-Armour-and-Artillery/DIO-155-mm-39-calibre-HM41-howitzer-Iran.html>.

<sup>67</sup> Senior Intelligence Officer – Iran, *Iran's Naval Forces*, p. 17.

howitzers. However, their price and complexity reduces the amount available in Iran's inventory than, for example, howitzer shells. Thus, like the great fortress guns at the Narrows, it is possible the ASCMs will be reserved for use against targets of direct strategic importance such as aircraft carriers. On the other hand, Iran may employ them against MCM assets in order to keep minefields intact: a lone MCM ship is more easily attacked than an aircraft carrier strike group. This is especially significant since Iranian ASCMs are not as advanced as those used by other countries and thus more susceptible to ASCM countermeasures. Given the choice between expending limited numbers of cruise missiles against a well-defended aircraft carrier versus a few unescorted minehunters, it is likely the latter will be chosen. In so doing, the Iranians, like the Ottomans, can let the mines do the work of sinking major ships.

Thus, the lesson here is that MCM assets merit as much, if not more, protection as major fleet units. Easy and vulnerable targets, their loss would severely constrain the USN's ability to maneuver in the region. Without adequate MCM capabilities, the rest of the fleet may well end up in the same situation as the Allied fleet on March 18<sup>th</sup>, 1915.

The possibility of Iranian submarine minelayers was mentioned above, and the conventional threat their torpedoes pose is obvious and well-known. But what about the attacker's submarines? British submarines were the only vessels in the Allied inventory that could travel past the minefields and into the Sea of Marmara, where they conducted anti-shipping missions. It was possible for cautious submariners to snake between the many moored mines without setting them off.<sup>68</sup> Could today's large nuclear-powered submarines do the same in the face of modern influence mines and if so, for what purpose? This is a potentially salient question, for although anti-shipping can be conducted today via aerial means, a significant amount of American first-stage attacks are conducted via ship- and submarine-launched Tomahawk missiles. There may be targets in northern Iran that could only be reached if the launch vessel was in the Persian Gulf, necessitating their passage through any minefields if it was not already there before the minefields were laid.

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<sup>68</sup> Langensiepen and Güleriyüz, *The Ottoman Navy*, pp. 76-81.

*Amphibious lessons*

The preceding analyses assumed a naval-only approach to reopening the Strait of Hormuz. Given the weariness of the Western public over Iraq and Afghanistan, civilian leaders will be reluctant to authorize the use of land forces in significant numbers for another Middle East conflict. However, as Admiral Fisher adroitly pointed out, “Not a grain of wheat will come from the Black Sea unless there is a military occupation of the Dardanelles.”<sup>69</sup> Analogically, the statement can be modified to “Not a drop of oil will come from the Persian Gulf unless there is a military occupation of the Strait of Hormuz.”

This perspective comes from the fact that while mines can be swept away and the waterway itself reopened, an operation that uses only ships will be unable to permanently prevent the enemy from using the shores for area-denial operations. In real-world terms, had the Allied battleships managed to pass the Narrows and into the Sea of Marmara in March 1915, what then? They would be low on stores and have to be replenished somehow. A supply vessel sent through the Dardanelles would be vulnerable to Ottoman harassment, since no Allied forces would prevent them from reoccupying the shores. The same vulnerability would apply to any Russian wheat carrier trying to get through the Turkish Straits. Thus, even if the navy did not require army forces to help destroy the forts and howitzers that guarded the mine field, it would still need them to ensure that traffic can pass in safety.<sup>70</sup>

The strategic lesson for the modern day scenario should be clear: it is almost certain that some kind of persistent presence has to be on Iranian shores to prevent them from being used (or reused) as staging points for attacking transiting oil tankers. Short of a complete Iranian surrender, American and allied ground forces will be necessary to enforce freedom of navigation in the Strait.

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<sup>69</sup> Prior, *Gallipoli*, p. 28.

<sup>70</sup> Halpern, *A Naval History of World War I*, p. 121; *Ibid.*, pp. 29, 41-42.

Having established the necessity of inserting ground troops, tactical-level lessons from the Dardanelles experience will now be discussed. One is that defenders can hide among civilian population centers and rubble. This may be a less effective tactic in the 21<sup>st</sup> century, given the extensive urban warfare experience American and NATO forces have had in recent years – experience the British lacked prior to the landing of their demolition parties. Nonetheless, this is crucial to keep in mind lest Western leaders mistake the broad swath of tan-coloured terrain on maps of Iran’s coast to be easily-occupied unpopulated desert.

Another lesson can be drawn from the Ottomans’ *ad hoc* use of tall civilian buildings (e.g. windmills and churches) as vantage points for artillery fire. Due diligence should be exercised when searching for Iranian intelligence, surveillance, and reconnaissance (ISR) assets. Small radars, electro-optical sensors, and light weapon emplacements can be hidden in civilian buildings. Iran may take advantage of coalition forces’ rules of engagement to hide equipment in structures that are politically dangerous to attack. The height and ubiquity of minarets, for example, make them a tempting solution in the event regular military ISR assets are destroyed. Although mosque *imams* may object to the military use of religious structures, the possibility should not be discounted.

These are some of the challenges American and coalition forces will likely face should an occupation of the Strait of Hormuz coast be carried out. Further examination of the Gallipoli campaign may unveil more lessons. However, the scenario of an invading amphibious force versus a well-prepared opponent is relatively common (compared to forcing through narrow waterways), and thus such an examination may be redundant in terms of existing literature.

## **Conclusion**

This paper had originally wished to examine the role that the Ottoman Navy played in preventing the British and the French from forcing their way through the Dardanelles. However, the research has clearly indicated that the Ottoman success was not the result of just the Navy; one may argue that the Army played the largest role,

with their howitzers preventing the minesweepers from completing their assignments. Many comparisons have been drawn between the past and the present, but the author would now like to acknowledge some of the deficiencies in this study.

Firstly, the threats posed by Iranian aircraft and fast attack craft (FACs) have not been mentioned. This decision was made not only due to space constraints, but because this paper's main objective was to see what lessons the Dardanelles experience could teach the present. 1915 saw no aircraft in use by the Ottomans; small fast surface craft was never employed in the scale and method that Iran's FACs are expected to via with the infamous "swarm" tactic. Thus, a full discussion of those two platforms is outside the scope of this paper. It suffices to say that on top of all the aforementioned challenges a Western fleet would face in the Strait of Hormuz, FACs and aircraft would only add to them.

Secondly, this paper ignores the element of alliances. How would Iran's ability to enforce a closure of the Strait of Hormuz be affected if Iran had the support of a more powerful country? Just as the Ottomans received significant German assistance at strategic and tactical levels (not to mention financial), so might Iran find similar support.<sup>71</sup> Who would be the most likely country (or countries) to provide that support? And in what form(s) might that support come? These questions merit further research in a separate paper.

Finally, it cannot be denied that although both the Dardanelles and the Strait of Hormuz are narrow waterways connecting two larger bodies, there are significant geographical differences. Perhaps the greatest is the matter of distance between shores, which is many times greater in the Strait of Hormuz. Yet, as the analyses in Part II indicate, the development of modern weaponry with their incredible reach has made this factor less significant than if the study were conducted decades earlier. Of course, it must be admitted that a comprehensive closure of the Strait of Hormuz via mines would require a much greater quantity than in the Dardanelles, even accounting for the greater coverage that modern influence mines provide.

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<sup>71</sup> Ulrich Trumpener, *Germany and the Ottoman Empire 1914-1918* (Princeton: Princeton University Press, 1968), pp. 67-70.

However, despite these and other drawbacks, this paper has demonstrated that many elements from the Ottoman defence of the Dardanelles can be applied to a modern scenario in which Iran seeks to close the Strait of Hormuz. In particular, the use of naval mines by a power with only a “small” navy can sufficiently halt and even defeat a much stronger power. The vulnerability of large and conventionally-powerful ships was shown on March 18<sup>th</sup>, 1915. Some may say the impact there was so large because the victims were old pre-dreadnoughts not equipped to handle underwater strikes. Yet, this would be ignoring the example of *Inflexible*, equipped with the latest anti-torpedo protection. Indeed, even *Yavuz*, the ex-German dreadnought, was incapacitated for over four months after hitting Russian mines off the Bosphorus.<sup>72</sup> As mines evolved and became more lethal and difficult to counter over the decades, the vulnerability of surface ships to mines remain unabated. A multi-layer defence of well-laid minefields, combined with intelligent tactics, operations, and strategic sense can allow a defender to rout a much stronger naval force with minimal losses.

This paper thus answers the question stated at the beginning of Part II in the affirmative – that yes, despite changes in technology over time, strategic (and operational and tactical) principles can still apply. Perhaps not entirely and always, but certain situations are similar enough that the past is valid reference for the future. To rephrase the common saying, learning from the past may well prevent it from being repeated.

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<sup>72</sup> Nekrasov, *North of Gallipoli*, pp. 36-37.