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Sea Transport and Supply

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Allied capacity at sea to sustain global transport and supply determined their ability to prevail in the First World War. The deployment of convoys to triumph over submarine warfare was an important dimension to winning the supply war. But no less pivotal were the acquisition of sufficient tonnage and the timely clearance of goods through ports despite severe strains total war forced upon supply routes and harbors. Particularly critical was the reservoir of maritime expertise and experience mobilized to master wartime logistics. Meanwhile command of the seas, blockade, and blacklisting effectively cut Central Power over sea supply lines.

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Introduction

The First World War was a war of colossal land battles on the continent of Europe, but it was the

ability of the Allies at sea to sustain global transport and supply that determined their ability to prevail in the conflict. Even American intervention required the means to ship 2 million men across the seas, supply them, and all the time retain sufficient transport to feed, fuel, and sustain civilian populations and mass armies in the field. Few other moments have so starkly illuminated the paramountcy for contemporary societies of international transport and trading networks or the global interconnectedness that informed them. War at sea therefore entailed far more than the classic confrontation of capital ships. The real sea battle in the First World War pitched German surface raiders, mines, and especially submarines against merchant shipping in an effort to interdict and destroy Allied overseas supply lines. That battle, however, simply highlighted two far more fundamental challenges that haunted the Allies from nearly the beginning of the conflict: how to find sufficient numbers of ships and how to manage shipping and port logistics in the midst of total warfare. There was too a second supply war at sea: the Allied campaign to deny Central Power access to world resources through blockade, black lists, and by sweeping the sea free of Central Power ships.[1]

Global Supply

Why did war in the 20th century challenge so completely global supply lines? To answer that question one must first comprehend how thoroughly dependent Europeans had become on overseas supplies of basic materials, including food. Britain imported 100 percent of its sugar, cocoa and chocolate; 79 percent of its grain; 64.5 percent of its butter; and 40 percent of its meat. Nearly two-thirds of the caloric intake of the British people came from abroad. Supplies of industrial materials such as cotton, oil, or rubber were completely dependent on imports. Imports provided a large share of the ore or metals worked by British factories. Three-quarters of the wool woven in British mills shipped in from overseas. France was more self-sufficient, yet the war distorted previous sources of supply. With borders closed, trade lines ruptured on the continent. Invasion and massive mobilization pared back domestic production of nearly everything, including basics such as grain. Already, before 1914, a majority of French imports traveled on ships. In both quantity and proportion, those figures mounted throughout the war. Germany, like France, produced much of what it consumed. But the country imported considerable quantities of coffee, cotton, wool, copper, rubber, animal fodder, and nitrates, which were essential for maintaining soil productivity. Imports accounted for perhaps as much as one-third of its food and nearly all its vegetable fats and oils. In value, about 70 percent of these imports traveled on ships, including grain from Russia.[2] All European countries were thus dependent, to varying degrees, upon a world economy. From early in the war Allied naval superiority at sea swept German merchant vessels from the oceans (see below) and established control of sea lanes. The question then was whether the Allied merchant marines could provide sufficient shipping to transport the vast overseas flows in goods and soldiers necessary to prosecute the war to a successful conclusion in the face of German naval threats and unprecedented logistical challenges.

The Naval Threat

From the first days of the war, German raiders and then submarines sought to cut Allied supply lines across the oceans. In the first phase of the war neither was a serious threat for two reasons. First, German surface raiders were limited in number and effectiveness. Light cruisers could travel at twice the speed of merchant freighters and they could use the telltale sign of steamer smoke or newspaper details on the arrival and departure of ships to identify prey. But otherwise, their advantages were few. Whereas sailing ships could stay at sea for months, the range of coal-driven raiders was utterly dependent on their bunker supplies, and captains of attack ships, on open and hostile seas, were consumed with the need to conserve or obtain coal. By the Hague Convention of 1907, it was possible to put into a neutral port for bunkering, but the amount that could be loaded on board was set at the quantity of coal necessary to reach the nearest home port. Moreover, at least three more months must lapse before the ship could bunker again in the same neutral country. Prior to hostilities the Germans, in anticipation of just such problems, had organized a system by which agents abroad, usually shipping company representatives, assumed responsibility for concentrating fuel, drinking water, and other provisions for cruisers operating in their vicinity. Inevitably, this system clashed with local enforcement of neutrality restrictions, and proved of limited value. The Germans also sent out colliers for prearranged rendezvous, sometimes in isolated anchorages along neutral coasts, even if this violated international law. Occasionally there were attempts to refuel at sea. The *Kronprinz Wilhelm*, a liner ship converted into an auxiliary cruiser, kept at sea for eight months partially by refueling from a collier alongside while proceeding at low speed through the water, but the damage to the ship was considerable. In the end, the best source of coal came from the prizes the warships captured. One estimate was that at least one-half of the cruisers' time was eaten up "either actually in coaling, or in steaming to and from the rendezvous at which supply ships were to be met or the transfer of fuel effected."[3]

In addition, wireless communication, international cables, the proliferation of Allied foreign bases and consular officials, and the presence of Lloyd's agents and signal stations favored steamers and their naval protectors in the intelligence war against raiders. Steamers could be warned of dangerous areas to avoid, recalled to port, or diverted in their routes, while hunters of cruisers could coordinate and concentrate their operations. In this regard, every port call for coal by a German captain betrayed his position and risked discovery on the high seas. Thus the balance weighed heavily in favor of the Allies, and even the most successful of raiders was doomed to a short, if blazing, career. The *Emden*, striking in waters near Colombo, managed to sink a Russian light cruiser, a French destroyer, and sixteen British merchant ships aggregating 70,000 tons before it was trapped and destroyed. But these were negligible losses in the greater scheme of things, and even the east Asian squadron of Maximilian Graf von Spee (1861-1914), despite its potential danger, was driven to the west coast of South America by Japanese intervention on the side of the Allies, and accomplished little aside from sinking some old British warships, before it too was hunted down by a superior force and annihilated.[4]

By far the greater threat from cruiser raiders was a crippling rise in insurance rates that would drive

merchant shipping from the sea. This was, in fact, the wider objective of German cruiser strategy. Possibly this could have occurred if it had not been for the introduction of the State Insurance Scheme, by which the British government assumed 80 percent of the risks on every voyage. Other countries followed suit in their own way. Whereas premiums in the first days of the war had skyrocketed to 20 to 30 percent of the cost of a voyage across the North Sea – rates that had forced the immobilization of the Norwegian fleet – nearly all ships were back in operation by the end of August.[5]

The submarine would emerge as the greater danger, but only in 1915, after the failure of the German High Fleet to accomplish any of its goals, did Germany introduce unrestricted submarine warfare in the seas surrounding Britain and Ireland. First World War submarines were limited in their range, speed, and depth, and it is not even clear that the German High Command had ever planned to deploy them as a strategic weapon. In 1915, Germany possessed only thirty-seven submarines, only some of which were suitable for attack and only a few of these were actively on duty at any given time. Yet the submarine could do what surface raiders could not. It was far less dependent on a fuel tether and could remain at sea for weeks before slipping unobserved back into port. Whereas raiders against a superior navy could operate with impunity only in distant seas, where their impact would never be critical, submarines could strike in the enemy's home waters where traffic was densest. In many cases, they could simply overpower freighters with their surface guns. In sheer tonnage terms, this first wave of submarine warfare produced impressive results: generally, more than 100,000 tons were sunk each month.

Submarine captains thus held in their grasp the prospects of ravaging Allied shipping, except for one crippling problem: the rules of engagement, written for surface warships capable of issuing warnings in advance, distinguishing between neutrals and foes, and taking prisoners on board, made them potentially outlaws in the eyes of the rest of the world and threatened diplomatic ruptures with neutral nations like the United States. Indeed, stung by American protests the German government shut down this first experiment in unrestricted attacks on merchant shipping in less than a year. Moreover, despite the numbers of ships sunk, through the first year and a half of war no dramatic interference with shipping occurred. Tonnage in mid-1915, through replacement or captured ships, was nearly what it had been in August 1914. The volume of imports into Britain between August 1914 and December 1915 was down about 12 percent, a manageable level and far from a life and death situation.[6]

The decision in early 1917 to return to unrestricted submarine warfare, however, created true crisis conditions. The number of submarines available for active duty was now 105, and by June it rose to 129. While certain guarantees were tendered to neutral shipping, the intention was not only to erode Allied tonnage but to scare neutrals off from Allied service. Compared to all previous periods of the war the losses were staggering: 520,412 tons sunk in February, 564,497 tons in March, 860,334 tons in April, and 616,316 tons in May. In one fortnight, seventy-eight British ships were sunk and the overall tonnage lost in these two weeks, if prorated over a year, would have amounted to half of the

merchant marine at the disposal of the Allies. Estimates of a vessel's chances of surviving a round trip between the United Kingdom and a destination beyond Gibraltar were, for this period, about one in four. The French situation was no less dire. Its merchant marine was so strained that colonial connections were, in certain cases, close to severing. Supplies of coal and especially grain were running perilously low. Everywhere in the Allied camp there was a sense that the sea transport system was cracking.[7]

The Tonnage Crisis

Yet the German U-boat offensive had simply thrown into perilously sharp relief a shipping crunch that had been building since at least 1916. In a larger sense, the emergency conditions of 1917-1918 were the consequence of the global and structural character of shipping and trade by the 20th century, and the effect that world war had upon them. As wartime priorities contracted, distended, or rearranged interlocked systems, the logistics of keeping flows moving became ever more challenging. Or, as the leading historian of seaborne transport in the First World War acknowledged, "the crisis of 1917-18 was the result of a cumulative deficit dating back almost to the beginning of the war."[8]

On the surface of things, the Allies possessed more than enough shipping for their war needs. In 1914, an overwhelming percentage of the world's merchant fleet was in Allied hands. Most of this was British. Out of a world steamship fleet of 45 million gross registered tons, about two-fifths (c. 19 million tons) were British flagged. If Dominion and other imperial-flagged shipping are added in, the total tonnage was 20,524,000 or 45 percent of the world's total. Parliamentary estimates placed slightly over half of the world's seaborne trade on British ships. The French steam fleet represented close to another 2 million tons. The Japanese and Italian fleets, respectively, totaled 1,700,000 and 1,430,000 tons. Russian merchant tonnage was 852,000 tons. When war broke out, diligent efforts on the part of the Admiralty to warn British captains of impending war prevented the capture of sizeable numbers of ships in enemy harbors. Only seventy-three steamers representing 170,000 tons were struck off the lists. On the other hand, 223 German steamers and thirty-five sailing ships amounting to 650,000 tons either were anchored in Allied ports at the start of the war or sailed in unawares over the next several days. However, the numbers are in some ways misleading. The British tonnage figure represented 8,587 steamers, but only 3,888 of these grossed more than 1,000 tons, the minimum suitable for ocean crossings. Dominion and colonial steamers above this level contributed only another 350 ships.[9]

War service produced a first deduction from these reconstructed numbers. Immediately upon the outbreak of war, the British government recognized the right of the Admiralty to requisition the ships it needed. Very quickly more than 1,000 ships totaling 4 million tons (rising to 6 million tons by the end of 1915) were taken over for direct naval use. 250 of these were called on to transport the British Expeditionary Force to France. Navy demands for mine carriers, fleet messengers, ammunition and supply ships, colliers, oilers, hospital ships, and so forth produced a further erosion of shipping

available for ocean carriage of basic supplies.[10] Throughout the war, transport of fighting men and their equipment ate up shipping that had been constructed for civilian needs. The French Salonika expedition alone consumed about 20 percent of France's merchant ships; over the course of the war, the French merchant marine transported roughly 630,000 men, 76,000 horses, and 1,460,000 tons of supplies for the Dardanelles and Salonika fronts.[11]

Distance was a still greater complicating factor. Sugar supplies provide a good indication why this was so. In peacetime Britain imported all of its sugar. Two-thirds of the supply came from beet sugar cultivated within the Central Powers. Forced to resort to alternative sources, the British expanded their purchases around the world. They bought in Java, Cuba, Mauritius, Peru, the British West Indies, and North America. France, a large producer of beet sugar but in its northern departments, also imported more heavily from abroad. In 1916, the entire Mauritius crop was consigned to France. Occasionally, the inability of British refineries to process all the raw sugar flowing in from abroad required captains to load raw sugar in Cuba, sail to Philadelphia, unload the cargo, and replace it with sugar refined in America. The sugar lifting operation around the world was impressive. At the height of the sugar harvest, sixty to seventy ships were allocated to sugar transport. A Royal Commission on Sugar Supplies was established to oversee purchase and distribution. Overseas shipping and trading networks were mobilized to arrange brokering, buying, and sugar charters around the globe. To simplify operations and prevent competitive bidding for labor and berths in congested ports, single agents – all established firms in the trades – represented both shippers and the Ministry of Shipping. Thus, sugar supplies were assured, but at the cost of forcing the replacement of distant sources for near ones.[12] As sugar ships steamed out to Java, Mauritius, or Cuba, ocean voyages doubled or tripled in length, which meant fewer voyages in a year for each of these vessels precisely at the moment when it was necessary to do more with less. Recourse to global sourcing in lieu of previously near-at-hand supplies pervaded other trades. French and Italian ships sailed to North and South America in search of commodities they had formerly carried home from the Black Sea area. Such dispersal of ships on longer voyages was not sustainable once the shipping shortage hit crisis levels in 1917. Then, the only resort was to abandon distant routes whenever possible and concentrate every available ship on transatlantic cargoes, despite the long-term overseas trading consequences.

Adding to the problem, was that global commerce was so interwoven with complementary trading relationships that it was not always possible to bypass links in the chain. For example, as the war strained coal production, and British commitments to supply France and Italy with coal strained the number of colliers available for wider exports abroad, the most economical shipping response would have been to limit the South American coal trade. But in peacetime, such tramp shipments of coal outwards from Britain to South America had balanced large meat and grain imports from the River Plate region. Sustaining those meat supplies in wartime rendered the South American routes vital, especially since they cut by half the transport time from Australia or New Zealand. Consequently, coal bunkers for grain and meat-carrying steamers had to be maintained. In addition, large coal imports were necessary to keep the Argentine freight trains running and to fuel scaled-up meat

packing plants and cold store installations. Sizeable American coal shipments did pick up much of the slack, but cutbacks occurred in the winter of 1917-1918. Even when American supplies were flowing, a part of British shipping was diverted to loading coal in the United States and carrying it to Argentina, a means of getting coal where it was needed, but via the right angles instead of the hypotenuse.[13]

Nor were the Allies able to build their way out of the shipping shortage. Britain's shipyards, deprived of labor and steel, and preoccupied with Admiralty orders, never matched their production rates of 1913. French shipyards went over to munitions production and constructed no new ships nor even finished those underway in 1914. American entry into the war did lead to a tremendous surge in shipbuilding, so that by summer 1918 replacement tonnage covered losses. But this effort came very late. Less than 350,000 tons of shipping was available to the U.S. military at the beginning of 1918. Even then, the U.S. did not fully compensate for the great increase in tonnage required by America's participation in the war. Indeed, initially the inadequacy of the American merchant marine to transport soldiers and supplies across the Atlantic compounded existing shortages.[14]

Ports, meanwhile, turned into bottlenecks because total war introduced inefficiencies that were absent in peacetime. Warships occupied needed berths or ate up dry dock space. Damaged ships put into the closest harbors. Often these ports lacked the equipment to discharge the cargo or the railroad infrastructure to move it out of the harbor area, resulting in congestion at the docks and railroad backups. Ships suspected of carrying contraband to Germany were dispatched to ports where their cargo was meticulously unloaded and then reloaded, a process that could take three or four weeks and constrict still further available quay space. And all of this occurred just as a greater reliance on ocean-going freighters forced a concentration of traffic upon the limited number of ports that were capable of handling them. In the meantime, the Admiralty and War Office converted a number of ports – Immingham, Harwich, Dover, Newhaven, and Southampton – into military installations, thereby increasing the commercial load on all the others.

Across the Channel, French ports in the north were hopelessly overwhelmed by the flow of people and equipment washing through them. The total of troops, staff, workers, prisoners of war, refugees, nurses, and other assorted categories that sailed between Britain and France during the war amounted to 16,500,000 people, and to this figure would have to be added additional American troop movements. Between 1914 and 1918, French imports tripled over their prewar equivalent. Traffic through Le Havre paid the price of dependency on a single rail line and inadequate inland waterway infrastructures. The situation in Italy was no better, and Genoa was in a near perpetual state of blockage. Back in Britain, various government offices in charge of purchasing foodstuffs shipped in massive volumes at concentrated times, with no thought as to how the receiving ports were going to move them.

Port labor shortages added to the muddle. Although port labor has often been categorized as "casual," the reality was that there were many jobs that demanded skill or knowledge, or that depended on cohesive gang work. Efficient crane operators, for instance, could not be improvised on

the spot. Port clearance thus suffered when large numbers of stevedore and dock workers were mobilized into military service. Out of Le Havre's approximately 7,000-strong labor force, 3,000 men were called up, including 1,000 of the port's "regulars." The state in part made up the gap by funneling in Belgian and French refugees and German prisoners of war. But their motivation was minimal, and among the POWs were men "of diverse professional backgrounds and the least suited to make even a lousy docker." One year into the war productivity fell by 50 percent. The same conditions prevailed at Rouen. Comparable shortages plagued British ports.

More than anything else, however, port congestion resulted from breakdowns in inland transport networks and their repercussions for harbor turnover. Although Liverpool and London possessed massive storage installations, the fundamental rule governing the working of ports in peacetime was the rapid distribution of goods from harbor to markets. In the First World War, this became impossible. Railroads strained under wartime demands. Freight trains ran full and had to cede right of way to troop trains or military trains carrying horses, guns, and munitions. In 1917, the Great Western Railway ran over 25,000 trains for government account alone, and the South Eastern and Chatham Railway ran 26,611 trains. Yet, 20,000 railroad cars and several hundred engines were also shipped overseas for service in France. Railway workers were drafted and maintenance men (and their shops) were often shifted to munitions production. At the same time, recruitment of bargemen and uncompetitive coastal shipping rates transferred still more freight to rail lines. Such an amassing of interferences with normal peacetime operations produced predictable results. As transport lines clogged, goods piled up in transit sheds designed for sorting and rapid transfer to inland transport, not for warehousing stocks. As transit sheds clogged, quays became unworkable. As quays became unworkable, ships sat in harbor waiting for berths to clear. Port turnaround times increased by 50 to 100 percent.

Submarine warfare that threatened the London approaches increased the pressure, and efforts to divert shipping to west coast ports were only partially successful. London was a lighterage port and could not be converted easily to massive rail use. Attempts to supersede a city infrastructure designed to live off of riverside supply lines with inland shipments by rail were likely to throw distribution networks into chaos. One effort to divert cargoes to Plymouth underscored the futility of feeding the entire London basin via rail deliveries from other ports. Out of 27,000 tons off-loaded, only 7,000 made their way to the capital, and there were railroad backups while they did so. It took approximately three weeks to unload the ships in Plymouth, whereas the job would have been done in seven in London.[15]

Port congestion was a worldwide phenomenon. In the Mediterranean, ports such as Bizerte and Port Said were designated as central bunkering, assembly, or transshipment points regardless of their limited facilities. On one occasion twenty ships sat in harbor waiting for berthing or anchorage space in Basra, suddenly an important staging point for British military operations in the Middle East. Even great ports such as New York, encumbered by war demands, functioned poorly. There were not enough work gangs at the docks to go around and loading and discharge times mounted. The number of grain elevators in the port was insufficient, and ships had to take a place in the queue.

Again the result was that ships badly needed on the high seas dallied in port.[16]

The return to unrestricted submarine warfare thus simply accentuated an already mounting shipping crisis by 1917. J.A. Salter, who served as Director of Ship Requisitioning, summed up the urgency of the situation when he described the allocation of British shipping in that year:

> In France, in Belgium, in Salonica, in the Dardanelles, in Palestine, British soldiers were facing the enemy. Their transportation from England, from Australia, from Canada, from India required an average use of 70 ships. They required to be maintained, to be clothed, to be fed, to have new railways for their operations, timber for their trenches and their huts, medical attention for their invalids and wounded (335 ships). Behind them in England, in Canada, and in America, the raw materials of the industries which made their munitions and their clothes had to be imported (350 ships). At the same time, the British Navy had to be supplemented by auxiliaries (100 ships); to be coaled, fueled, and supplied (300 ships). Meantime the Allies had corresponding needs for which their own ships did not suffice (500 ships). And all the time the home population required to be fed, and supplied with other necessities of life (750 ships). By this time every sea had been swept, every trade denuded, to obtain every possible ship ...The distant trade of the country was reduced to a few vessels built for special work in confined seas, and unsuitable for general work; some even of these had in the extremity been hazardously pressed into service; and there was still no margin. And all the importing departments and combatant services were crying out for more ships, each with the menace of an imminent breakdown which would be fatal to the continued prosecution of the war.[17]

Solutions

Allied states took progressively aggressive steps to assure sufficient procurement and transport of essential supplies. As we have seen, the British Admiralty, upon the outbreak of war, possessed the right to requisition the ships it needed. Meanwhile, a state insurance scheme introduced in the first days of the war kept ships at sea. Within several months the government had also worked out a scheme for charter terms and official freight charges which came to be known as Blue Book rates. By the end of 1915 a Ship Licensing Committee was coordinating non-requisitioned shipping with war priorities. Henceforth, no British ship could voyage to a port outside the British Empire without the approval (that is, license) of the Committee. Shipping companies were still free to arrange their own cargoes, but not if these clashed with government preferences. As of 1916, no British ship sailed completely outside of government control. In December of that year, a Shipping Controller, and the Ministry of Shipping under his executive direction, possessed the power to assign ships to any route deemed necessary for national interests. The effective result was that a Liner Requisition Committee working within the Ministry of Shipping increasingly diverted global British shipping to concentrate on the decisive North Atlantic traffic. Yet even with such surpassing authority, the Ministry was not entirely free to allocate shipping purely on the basis of war priorities. For instance, Indian exports to the United States were of such critical exchange value to the British Treasury, while Indian markets remained so critical for British business, that a certain level of shipping to-and-from India had to be be sustained. In the same vein, exports to Argentina and to Java could not be cut too drastically without compromising the ability to pay for imports from these regions. Where the heavy hand of the Liner Requisition Committee fell most dramatically was on trades with East Asia and Australasia,

and on the cross-trades between North and South America. It was from these routes especially that large numbers of ships were diverted to service on the North Atlantic.

Moreover, even as the powers of the Shipping Controller (and the bureaucracy of the Ministry of Shipping) expanded, the day-to-day task of managing transport and supply across the seas remained the prerogative of shipping companies and their trans-oceanic organizations. Much of this was a consequence of powerful shipping interests that were prepared to operate on the government's account and to direct their ships where the government sent them, but insisted that the leading companies themselves retain control of how ships were loaded and how ships were run. The consequence was that big companies such as Cunard (see below), deemed "Established Lines," with network resources, knowledge, and experience on the North Atlantic run, continued to operate their own ships as well as the ships of other companies now diverted to Atlantic carriage and placed under their managerial supervision.

France, too, imposed a license system, later than Britain's but one that also set routes, itineraries, and cargoes to be transported. A *Sous-Secrétaire d'Etat de la Marine Marchande* (superseded in 1918 by a *Commissaire aux transports maritimes*) concentrated powers comparable to those of the Shipping Controller. Eventually these two streams converged into inter-Allied arrangements to allot tonnage according to Allied supply needs. A key moment in this development was the mission of Etienne Clémentel (1864-1936), French Minister of Commerce and, by 1917, in control of French maritime transport, to London in Autumn 1917 in search of more ships for emergency grain transport for France. So fraught were things that Clémentel's round of visits with ministers and war bureaucracy chiefs, produced not only the necessary ships but a pooling arrangement that became the platform for the elaborate inter-Allied economic coordination constructed in the final year of the war.

By early 1918, therefore, an Allied Maritime Transport Council was coordinating the pooling of Allied shipping. The Council exercised direct authority only over neutral ships that had fallen under Allied command. Each Allied nation retained direct control over its own ships. But from its first meeting in March, the Allied Maritime Transport Council, composed of national representatives either holding executive ministerial authority or able to secure it, oversaw the trans-alliance allotment of sea transport to where it was most crucially required. In practice, French and British shipping was assigned coal carriage to Italy, or British ships to carry locomotives and rolling stock to France. Some measure of the coordination can be gleaned from the following statistics. By summer 1918, Allied tonnage available for imports amounted to 15,500,000 tons: 72 percent of this was British, but only 57 percent was carrying imports to Britain. But inter-Allied shipping cooperation also boiled down to coordination of loading of ships in America, where lighter-weight American equipment could eat up hold space without filling the ship down to its Plimsoll or water line, while heavy French cargoes of steel and rails produced exactly the opposite effect. By working out an agreement to combine heavy French cargoes with lighter American ones on U.S. ships in exchange for additional tonnage allocated to the Americans, North Atlantic carriage was raised to new levels of efficiency.[18]

A parallel pattern of ever-increasing controls and inter-Allied coordination marked procurement of key commodities. Before the end of the first month of the war, a Royal Commission on Sugar Supplies oversaw purchase and distribution of sugar. In 1915, to assure necessary meat supplies, the British Board of Trade purchased the bulk of Argentine exports and the total exports of Australia and New Zealand (it also chartered for the duration of the war all the refrigerated space on liners in both the South American and Australasian trades). More important still were measures taken regarding the importation of grain, the one commodity most critical to staying power. Together, the creation of a Royal Commission on Wheat (October 1916) and a Wheat Executive (November 1916) sought to centralize buying, transport, and distribution of world wheat supplies for the Allied nations. The Royal Commission, acting on behalf of all Allied combatants, maintained agents in the United States, Canada, India, and Argentina. Moreover, the Commission and the Wheat Executive came to form a template for subsequent inter-Allied organizations, including the sharing of overseas transport. Once created, the Allied Maritime Transport Council oversaw not only the distribution of available shipping but the review and, when necessary, revision, of national import programs to correspond to the realities of tonnage.[19] After the war, Director of Ship Requisitioning Salter was to argue that alongside the introduction of convoys it was this inter-Allied shipping and supply apparatus that ultimately overcame the effects of unrestricted submarine warfare and likely staved off Allied defeat.[20]

Whether German submarine warfare would have brought the Allies to their knees is unknowable, because within months of introducing a convoy system, the Allied navies had largely stemmed the greatest threat to shipping at sea. Convoying of merchant fleets was a very old tactic deployed by the maritime states of Europe with a long history of success. English use of convoys could be dated back to the time of Henry II. The navies and privateers of Europe had lusted after the Spanish treasure convoys from the New World, but between 1540 and 1650 only half a percent of the ships that had sailed in these convoys had fallen to enemy attack.[21] Yet for the better part of the First World War, with Britain dependent on supplies by sea, the Admiralty had resisted assigning ships to convoy duty. Its arguments were nearly unending. Steamships were independent of winds and could avoid the most dangerous sea lanes. Convoys would waste time to assemble. The use of the wireless to do so would tip their hand to the enemy. Merchant ships could not keep station, that is, could not hold their place, or station, in fixed columns. Slow ships would impede faster ones. The substitution of steady flows by concentrated formations that arrived at one time would overwhelm ports. Large formations would make it difficult to zigzag, the best diversionary action against submarines. There were not enough escort ships to go around.

All but the last of these arguments proved without foundation. Navies did have to scramble to assemble adequate destroyer support. Yet they could also supplement destroyers with cruisers, sloops, and armed merchant men. The preference for evasive action, which the Admiralty was certain could not be maintained in large formations, was costly in time and, like distance, contrary to the priority to extract as many voyages as possible from a finite number of ships. In one instance, a liner from India zigzagged its way across 2,560 miles of ocean between Gibraltar and London, nearly

doubling the mileage on a standard run.[22] Perhaps one reason why more pressure was not brought to bear earlier was that ship owners and ship masters could also be loath to sail in convoys. Yet convoys, as they had centuries earlier, did prove to be something of a magical solution. From the time that the system was introduced in May 1917, following the disastrous month of April when 860,000 tons had gone to the bottom of the sea, the loss figures showed a steep decline. Gradually the number and range of convoys expanded, until by the end of the war nearly 17,000 ships had sailed under escort across the Atlantic with only 1 percent sunk.[23]

Two other measures, in addition to inter-Allied controls and convoys, explain why the shipping crisis was overcome. One was the chartering, and even marshaling, of the greater part of neutral fleets. Neutral shipping at the start of the First World War numbered in the millions of tons. There were close to 4 million tons in the combined Scandinavian steamer fleets, nearly 2 million of which were Norwegian. The Dutch merchant marine amounted to another 1,472,000 tons. The Greek merchant marine totaled about 820,000 tons.[24] Much of the European tonnage, especially Greek and Scandinavian, was active in the tramping trades and therefore accustomed to carrying grain, coal, and ore, the basic materials of wartime commerce. To take one example, of 734 ships carrying coal from the port of Cardiff to France in the first two months of 1916, 120 were British, 124 were French, while 242 were Norwegian, sixty-one were Spanish, forty were Greek, and thirty-six were Swedish.[25] Access to these sizeable fleets, however, could in no way be taken for granted. Pre-war commercial ties with Britain, pro-Allied sympathies among ship owners, and dependency on imported coal did secure the support of the greater part of the Norwegian merchant marine. This was much to the Allies' advantage not only because of the size of the fleet but because so little of it was employed in the Norwegian home trades. The Netherlands, however, was far more vulnerable to German pressure. Traffic through its inland waterways and its greatest port – Rotterdam – had grown in conjunction with German economic expansion, and a far larger percentage of the Dutch merchant marine was required to provision the home population. While Dutch ships from the beginning carried Allied cargoes, the comprehensive arrangements with Norwegian ship owners and easy dependence on their carrying power never pertained to Allied relations with Holland.[26]

The biggest challenge was overcoming the disincentives to transporting for the Allies. Many ship owners sought out the highest paying trades regardless of relevancy to war needs. After the introduction of submarine warfare, and especially after its resumption in its most ruthless form, many captains simply did not sail or lingered in port for "repairs." Others worked the least dangerous waters far from the combatants. Not surprisingly, then, it was primarily neutral ships – Norwegian, Swedish, and Dutch – that operated the Belgian Relief scheme by which food was shipped into occupied Belgium with the mutual approval of all combatants and thus with immunity from German submarine attack. Late in the war, the Germans introduced a safe-conduct pass for ships that guaranteed not to call at enemy harbors. This had little impact aside from the odd effect that captains refused to leave the French port of Sète, the official gateway through which Swiss transit traffic passed, until they received their German pass. Unrestricted submarine warfare did threaten to

sweep much of neutral tonnage from the seas.[27]

Desperate however to increase tonnage, the Allies did whatever was necessary to secure neutral ships. Britain reinsured Norwegian ships when heavy losses threatened to overwhelm Norway's wartime insurance provisions. In the first months of 1917, when other neutral ships were staying close to port, Norwegian ships continued to take to the seas. As huge losses continued to pile up – few, if any countries lost as large a percentage of their pre-war merchant marine as did Norway – Britain guaranteed sufficient coal imports and carried these to Norway in armed ships. In return, ship owners placed Norwegian vessels under British charter or under British command.[28] When persuasion with other nations failed, the Allies turned to strong-arm tactics. They were well positioned to do so, not only because of their powerful navies but because they controlled coal-bunkering supplies on all the major sea lanes, save in East Asian and North American waters. No ship suspected of trading with the enemy bunkered coal. By 1916, no ship loaded fuel coal unless it carried Allied cargoes. No neutral tramps received coal cargoes in United Kingdom ports unless they brought back preferred commodities or could prove that no such cargoes were offering. The more desperate the situation, the more ruthlessly they turned up the pressure. Frustrated with the inability to negotiate a deal over Dutch ships, the Allies fell back on the law of Angary and force-chartered Dutch vessels sitting in American and British harbors. More than 140 ships were acquired for Allied service this way. Comparable pressure was directed toward idle Scandinavian ships, while cutbacks in exports of cotton, phosphates, and oil tightened the screws on the Swedes to free up still more tonnage. In the end, by one method or another, the Allies found additional ships when their own fleets were insufficient and strained to the limit.[29]

Ships, however, were still only a means of carriage, and so it was necessary to master wartime logistics, that is, to figure out how to deploy ships in the midst of a total and global war that had warped the ways world flows had operated in peacetime. The war minimized some trades and flooded others. Shipping was requisitioned, rationed, and diverted. Troop transports and expeditions created new traffics out of scratch. These traffics, in turn, required hastily constructed supply lines. Always the Allies were reinventing or improvising. To take one corner of the world as an illustration of the challenge, coordination of shipping movements through the eastern Mediterranean consisted not only of established traffics – ships passing east and west through Suez or, say, cotton and onion shipments from Alexandria to England – but now troop movements between Marseille, Taranto, and Egypt or meat shipments from Australasia via Egypt to Salonika, not to mention new or expanded sugar transport between Mauritius and the United Kingdom.[30] Finding ships was one thing, working them and ports to maximal advantage under crisis conditions was something else altogether.

Yet maritime nations, before 1914, had constructed and operated a global transport infrastructure capable of moving anyone and anything from one point on the globe to another with regularity and speed. Shipping companies had built transoceanic route networks with multinational agent organizations to manage turnaround in the ports of call. Coastal, inter-island, and riverboat companies connected the deep-water routes to inland or distant markets and sources of supply,

regardless of how remote the location. Intermediaries like ship agents, freight forwarders, and an array of brokers, dealers, and assorted other "middlemen" provided the linkage between trade and transport or the interchange mechanisms that connected one partial global network to another. Trading companies not only provided the conduits through which the world's goods poured; they were also often the bridge between ocean-traveling shipping companies whom they served as ship agents and clients and indigenous business networks in Latin America, Africa, and South and East Asia with whom they did business through their own regional networks. Ports were vast installations of quays, docks, warehouses, sheds, cranes, grain suckers and the like, but also informational hubs through which streamed intelligence on the world's markets, prices, commodities, and opportunities. And the men who handled all of these things – the ship company executives, the ship agents and forwarders, the port authority directors and harbor captains, the stevedore company owners and employees – were nearly all individuals who had spent a professional lifetime managing and troubleshooting the world's flows. They knew how to schedule and slot in ships; how to stow ships down to their marks; how to turn around ships in port regardless of the complications created by weather, shortages of equipment and berths, or inadequate paperwork or warning; how to move goods into and out of ports with dispatch; how to perform complicated switching; in effect, how to fix nearly any challenge fate or incompetency threw their way. This infrastructure, but particularly the vast reservoir of expertise and experience that underpinned and drove it, provided the means by which Allies not only found sufficient tonnage but managed the reconstruction of worldwide logistical systems to sustain sea transport and supply throughout the war.[31]

The Port and Transit Committee the British created to break the logjams at its home ports offers a good illustration. This committee was a wartime fabrication, dating from the end of 1915. Every day it received information on berth and storage availability and on rail and barge traffic at Britain's twelve leading ports and supplemented this with weekly reports on anticipated arrivals of key commodities such as wheat, ore, and munitions. Summaries were then sent to the twelve ports so a comprehensive body of knowledge was both collected and circulated for common use. At more direct levels the Committee organized mobile labor reserves, pooled railway wagons, created incentives to revive coastal traffic, forced companies to clear out sheds, in short did whatever was necessary to overcome the congestion that was strangling harbors. Throughout its operations, it worked with relevant government agencies but also ship-owners' associations, import and export houses, and chambers of commerce, all established figures or institutions in maritime trade. Its first chair was James *Mackay*, 1st Earl of Inchcape (1852-1932), who headed Britain's largest shipping company, the Peninsular and Oriental Steam Navigation Company (P&O). Seated also on the executive committee were Frederic Bolton of Lloyd's, Britain's leading marine insurance company; Joseph G. Broodbank (1857-1944) of the Port of London Authority; and Sir Norman Hill, chairman of the Liverpool and London War Risks Insurance Association and a member of the Liverpool Steam Ship Owners' Association. Its liaison with the Ministry of Shipping was L.A.P. Warner, the Deputy General Manager of the Mersey Docks and Harbour Board (and later its General Manager).[32]

The pattern of mobilizing experts repeated throughout all the improvised bureaucracies that came to

depend on shipping and trading men to run them. The first man appointed as Shipping Controller was Joseph Maclay (1857-1951), a partner in the Glasgow shipping firm of Maclay and McIntyre. France's first head of its Maritime Transit Section was a ship broker. Ashley Sparks, who headed the Ministry of Shipping's operations in New York by the last year of the war, had worked for Funch Edye, a big American ship agency, before joining Cunard, where he rose to the position of chief representative in the United States in 1917. Frederic Scrutton, whose family owned one of the two largest stevedoring firms in London, was sent to the French channel ports to inspect port handling procedures. Alex Monteath, a P&O director, traveled on a comparable mission to Bombay and Basra. The entire shipping and purchasing bureaucracy co-opted maritime experts into its executives. The sugar and wheat commissions bought through experienced traders and brokers and assigned their agencies abroad to shipping agents with much knowledge of local ports. Shipping men supervised clerks in the Wheat Commission. Ship owners and managers joined the Admiralty's staff. Furness Withy, one of Britain's largest shipping companies, oversaw the chartering of neutral ships. Through the "Established Lines" policy, shipping companies with long experience on certain routes were delegated control of specific wartime traffics, so that, for instance, the trans-Atlantic giant, Cunard, managed 180 liners sailing the Atlantic and turned around 350 ships transporting grain for the Wheat Commission. Having also run a large trans-Atlantic emigrant business from the Adriatic before the war, Cunard was equally assigned Wheat Commission shipments to Italy. French shipping companies, too, managed neutral charters carrying cargoes for France, and a committee composed of five ship owners or directors advised the *Sous-Secrétaire d'Etat*, France's equivalent to Britain's Shipping Controller. As much as anything else, the mobilization of the maritime business resources that had created and run a global transport system before 1914 explained Allied success in sustaining seaborne supply throughout the war.[33]

Central Power Shipping

There is a counter-narrative to the history of Allied sea transport and supply: the sweeping of German and Austrian ships from the sea. In 1914, Germany possessed the world's second largest merchant marine. More than 5 million tons of shipping sailed under the German flag. More than 2 million tons alone were concentrated in Hamburg's HAPAG line and Bremen's *Norddeutscher Lloyd* line (NDL), both among the very largest shipping companies in the world in 1914, and both operating global route systems at a time when most of the world's shipping lines sailed in only one or two oceans. Despite its identification as a large and crumbling land empire, the Habsburg Empire's merchant fleet registered another 1 million tons. Yet practically from the start of the war, both merchant fleets were immobilized by Allied control of the seas. Not only was 12 percent of the German fleet seized in British and British Empire ports when war was declared, but with the outbreak of hostilities German ships at sea were warned to seek the closest neutral harbor. By the end of the first five months of fighting, once those ships held in allied ports, captured on the high seas, or holed up in neutral harbors are subtracted, only about 2 million tons of shipping remained available and practically none of these dared venture into open waters.[34]

The scattering of the German fleet, like its networks, was worldwide. A HAPAG tabulation from 1916 showed that aside from ships in government service, sunk, sold, or requisitioned after Italian entry, thirty-four sat in Hamburg, ten in Portuguese harbors, eight in Atlantic island harbors, twenty-four in American ports, twenty-one in ports along the South American coasts, and fifteen in Asian ports. A Foreign Office report from 1917 positioned over 400,000 tons of German tonnage alone trapped in Brazil and Chile, with an additional 70,000 tons sitting in Argentine harbors while still other ships lay idle in Peru, Columbia, and Uruguay.[35] Occasionally captains decided to make a break for home. The *Rio Negro* of the Hamburg Süd company made it safely back. A converted river steamer, the *Vasco da Gama*, set out in 1915 under the disguise of sailing with a rubber cargo to New York and captained by a Brazilian national (Norwegian born) with a Brazilian crew. Five hours from the Norwegian coast the ship was taken by a British cruiser. Mostly, however, ships simply sat in harbors, safe in some at home or abroad, but plucked in others by formerly neutral states turned combatants like the United States, Cuba, and Brazil. The only sphere of operations where German merchant shipping continued to serve a purpose was the Baltic, or in safe, close-in areas of the North Sea. As many as 200 ships in late 1916 were carrying ore from Sweden. But that was about all.[36]

Blockade and Blacklist

Allied forces supplemented the elimination from the seas of Central Power shipping with two other measures: a blockade and a blacklist. In both cases, the aim was to prevent overseas supplies from entering Central Power territory either via foreign-flagged vessels or through re-exports from neutral countries. Navies set up choke points at the Downs area of the Channel, at Kirkwall in the Orkneys, and at Alexandria and Gibraltar in the Mediterranean to prevent contraband, which came to mean any goods destined for Central Europe, from getting through. This provided the physical stranglehold. The Black List identified suspect importers or exporters on ships' manifestos and was designed as well to scare off neutral and rogue companies from trading with the enemy. Once placed on the Black List, a firm was denied commercial, transport, cable, or financial transactions with companies under Allied jurisdiction. Its goods automatically earned the classification of contraband. It could buy no insurance from Allied insurance companies.[37]

There were many ways that the Central Powers could attempt to circumvent the blockade. Their agents prearranged captures of freighters headed to neutral ports. Large shipments were broken down into many small ones, shipped on big, neutral liners that were not easy to detain for a lengthy period. These shipments were also scattered among a host of consignees in neutral countries, most of them illegitimate. Ships left American harbors with two sets of papers. Or other shipments were consigned to dock workers.[38]

The two tactics that poked the biggest holes were re-exports via neutral countries and the use of cloaks to hide the identity of blacklisted companies. Massive quantities of goods were shipped to neutrals, especially Denmark and the Netherlands that shared a common border with Germany, and

then re-exported into Germany. Consequently, foreign trade statistics registered huge drops in exports from the United States to Germany following the implementation of the blockade but also equally huge increases in American exports to Scandinavian countries and Holland. Likewise, German coffee exporters in Guatemala who had shipped $47,000-worth of coffee to the Netherlands in 1913 exported $1,700,000-worth of coffee to the Netherlands in 1915, an increase by a factor of thirty-six. Indeed commodities that neutrals had exported in normal years suddenly appeared on their import columns; Denmark, for instance, imported over a million pounds of lard in the fall of 1914.[39]

Blacklisted trading houses or neutral firms known to be acting as their intermediaries also fought back by cloaking their identities under bogus names. The Allies eventually ferretted these out, but the task was Sisyphean. No sooner had one cloak been revealed than a new one was invented. Some firms went through multiple bogus identities or shell companies, a cat-and-mouse game that played out across the world.

To seal these gaps in the blockade the Allies turned to three devices: agreements with neutral countries to clamp down on re-exports to Germany and Austria, agreements of the same ilk with business sectors, and the rationing of neutral imports to levels of consumption before 1914. Dutch businesspeople, to preempt Allied interference with Dutch overseas trade, thus guaranteed that imports of certain goods would not transit across the border to Germany. To carry this out they established the Netherlands Overseas Trust Company (NOT). Switzerland's *Société Suisse de Surveillance Economique* served roughly the same purpose. In other cases, a series of conventions with Scandinavian merchant associations or ship owners restricted imports of certain goods to prewar levels. Continued recalcitrance brought stronger measures such as the seizing of ships. The longer the war wore on, the less reluctant the Allies were to resort to coercion. The entry of the United States, the largest neutral, into the war tightened the noose still further.[40]

It was never possible to render the blockade watertight. Neutrals bordering Germany, subject to counter military and economic pressure from an overwhelmingly powerful neighbor, negotiated compromises in their settlements with Allied forces. Smugglers saw great opportunities to make money out of the restrictions. Swedish ore exports continued to flow over the Baltic, a sea beyond the reach of Allied ships. Not only did cloaks continue to mask firms trading with the Central Powers, but the entrenchment of big trading houses in host supplier countries and the cosmopolitanism of their management and ownership made it impossible to shut them down even when they were placed on the Black List. Still, none of these obstacles prevented the Allies from accomplishing their primary objective: quarantining the greater share of Germany's overseas trade. By the third year of the war seaborne flows to and from Germany had slowed to a trickle.

Conclusion

Our classic portrait of the First World War is one of stalemate and mass casualties at the Western Front. Yet the war was won as much on sea as on land through the Allied nations' ability to mobilize

the world's resources for themselves and, just as importantly, through their ability to ship those resources across thousands of sea miles to points of production and consumption in their home countries. That victory has often been seen as a triumph of convoys over submarine warfare. It was no less a story of the collective triumph of maritime expertise. Men familiar with operating global systems of transport and trade on a day-to-day basis applied their skill and years of experience to overcoming the warping consequences of war. In this regard, the First World War, generally acknowledged as the moment when globalization broke apart, proved to the contrary an affirmation of global connectedness. Where older integrated systems did, temporarily, buckle came as a consequence of the cornering of world resources for the exclusive use of one set of combatants. The effect upon the staying power of the Central Powers has been much debated and is a question that extends beyond the scope of this article. What can be asserted is that combined and integrated strategies – clearing the seas of German and Austrian ships; blacklisting firms that traded with the enemy; curbing neutral re-exports, whether through methods of persuasion or coercion; and the physical implementation of a blockade at sea – denied Germany and Austria access to overseas supplies at the very time that Britain and France were mastering their transport in wartime.

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Notes

1. ↑ This article has drawn upon material from within Michael B. Miller, "World War I", pp. 213-244, from Michael B. Miller, Europe and the Maritime World: A Twentieth-Century History (2012) © Michael B. Miller 2012, published by Cambridge University Press, reproduced with permission.
2. ↑ Fayle, C. Ernest: Seaborne Trade, volume 1, New York 1920, pp. 3-16.
3. ↑ Ibid., p. 22.
4. ↑ Ibid., pp. 21-27; Halpern, Paul: A Naval History of World War I, Annapolis 1994, pp. 65-100.
5. ↑ Fayle, C. Ernest: The War and the Shipping Industry, London 1927, pp. 35-36, 57-63; Paris, Service Historique de la marine (SHM) / SSEa 380/20 December 1918; Petersen, Kaare: The Saga of Norwegian Shipping. An Outline of the History, Growth, and Development of a Modern Merchant Marine, Oslo 1955, p. 57.
6. ↑ Halpern, A Naval History 1994, pp. 287-303; Fayle, C. Ernest: Seaborne Trade, volume 2, New York 1923, pp. 1-4, 27-38, 127; Fayle, War 1927, p. 103; Salter, J. A.: Allied Shipping Control. An Experiment in International Administration, Oxford 1921, pp. 2-4, 46-47.
7. ↑ Halpern, A Naval History 1994, pp. 335-341; Salter, Allied Shipping Control 1921, pp. 3-4; Fayle, Seaborne Trade, volume 3, New York 1924, pp. 30-31, 91-93; Fayle, War 1927, p. 278.
8. ↑ Fayle, Seaborne Trade 1920, p. vii.

9. ↑ Behrens, C.B.A.: Merchant Shipping and the Demands of War, London 1955, p. 17; Fayle, War 1927, pp. 2-8; Fayle, Seaborne Trade 1920, pp. 54-57; Dyson, Brian: The End of the Line. Oswald Sanders, Sir John Ellerman and the Wilsons of Hull, in: Starkey, David J./Jamieson, Alan G. (eds.): Exploiting the Sea. Aspects of Britain's Maritime Economy since 1870, Exeter 1998, p. 59. For an alternative calculation of British shipping capacity, see Lambert, Nicholas: Planning Armageddon: British Economic Warfare and the First World War, Cambridge, MA 2012, pp. 238-240.
10. ↑ Fayle, War 1927, pp. 39, 102.
11. ↑ Cangardel, Henri: La marine marchande française et la guerre, Paris 1927, p. 85.
12. ↑ London, National Archives (NAUK)/Ministry of Transportation (MT) 25/86, pp. 343-355; NAUK/MT23/390/T20832/1915/ 5 June 1915; Fayle, War 1927, pp. 163-164.
13. ↑ NAUK/MT25/87/IV, Chapter 1, pp. 258-259; Fayle, Seaborne Trade 1924, pp. 323-324.
14. ↑ Salter, Allied 1921, pp. 81-84; Cangardel, Marine 1927, 49; Barbance, Marthe: Histoire de la Compagnie Générale Transatlantique. Un siècle d'exploitation maritime, Paris 1955, p. 215; Tooze, Adam: The Deluge. The Great War and the Remaking of Global Order, London 2014, pp. 202-204.
15. ↑ NAUK/ MT 25/6/#72073/19 March 1918; NAUK/MT 25/62, 15 March 1921; NAUK/MT 25/86, pp. 217-218, 365-366; Vigarié, André: Les grands ports de commerce de la Seine au Rhin. Leur evolution devant l'industrialisation des arrière-pays, Paris 1964, p. 450; Fayle, War 1921, pp. 41-42, 319; Fayle, Seaborne Trade 1923, pp. 62-66; Fayle, Seaborne Trade 1924, pp. 164, 334-336; Salter, Allied 1921, pp. 53-54; Paris, Archives Nationales (AN)/ F 12/ 7746, 3 July 1915 (quoted), 6 July 1915.
16. ↑ NAUK/ MT 25/48/ #46174, 28 March 1918; NAUK/ MT 25/ 14, 26 July 1917, 11 September 1917; Cangardel, Marine 1927, p. 54; AN/ F12/ 7792, 19 May 1918.
17. ↑ Salter, Allied 1921, pp. 77-78.
18. ↑ Fayle, War 1921, pp. 157, 163-166, 199-213, 223-225; idem, Seaborne 1924, pp. 6-11, 112-127, 241-246, 297-306, 374-376; Salter, Allied 1921, pp. 36-37, 49-50, 147-187, 214; Cangardel, Marine 1927, pp. 37-43, 51-65; AN/F 12/7797; Duroselle, Jean Baptiste: Strategic and Economic Relations during the First World War, in: Waites, Neville (ed.): Troubled Neighbors. Franco-British Relations in the Twentieth Century, London 1971, pp. 54-61; Barbance, Histoire 1955, pp. 219-220; Monnet, Jean: Mémoires, Paris 1976, pp. 67-96.
19. ↑ NAUK/MT/25/86, pp. 356-361; Salter, Allied 1921, pp. 91-93; Fayle, War 1927, pp. 193-195; idem, Seaborne 1924, pp. 240-241, 293-296, 372.
20. ↑ Salter, Allied 1921, p. 6. See also Monnet, Mémoires 1976, pp. 92, 96.
21. ↑ Rodger, N.A.M.: The Safeguard of the Sea. A Naval History of Britain 660-1649, New York 1999, pp. 106, 242.
22. ↑ Fayle, Seaborne Trade 1923, p. 381.
23. ↑ Halpern, Naval 1994, p. 365.
24. ↑ Behrens, Merchant 1955, p. 17.
25. ↑ Petersen, Saga 1955, p. 64.
26. ↑ NAUK/MT 25/87/IV, Chapter III, pp. 47-48, 77-87.

27. ↑ SHM/ SSEa 344/ 30 July 1918; Guichard, Louis: Histoire du blocus naval (1914-1918), Paris 1929, pp. 94-97; Schaepdrijver, Sophie de: De Groote Oorlog. Het Koninkrijk België tijdens de Eerste Wereldoorlog, Amsterdam 1997, pp. 108-110; Salter, Allied 1921, p. 171; Fayle, Seaborne Trade 1924, pp. 27, 261, 303-304.
28. ↑ NAUK/MT 25/87/IV, Chapter III, pp. 47-53, 62; Petersen, Saga 1955, pp. 59, 67-69.
29. ↑ NAUK/MT 25/87/IV, Chapter III, pp. 29-32, 34, 37, 79-84; Salter, Allied 1921, pp. 103-107; Leeman, F.W.G.: Van barkschip tot 'Willem Ruys'. 120 jaar zeevaart, Rotterdam 1961, p. 169; Guichard, Blocus 1929, pp. 111-113, 144-148, 151-156.
30. ↑ On Mediterranean sea lanes in the last year of the war, see NAUK/MT 25/48/#46174, 28 March 1918.
31. ↑ Miller, Europe 2012.
32. ↑ NAUK/ MT 25/62/#36260/ Final Report of Port Transit Committee, 15 March 1921; Fayle, Seaborne Trade 1923, pp. 197-199; Fayle, Seaborne Trade 1924, p. 168.
33. ↑ Miller, Europe 2012, pp. 224-225.
34. ↑ Guichard, Blocus 1929, pp. 13-14; Fayle, Seaborne Trade 1920, pp. 56-57.
35. ↑ Hamburg, Staatsarchiv Hamburg/ Firma HAPAG-Reederei (HAPAG)/ 1135/ UA 7, 5 January 1916; AN/ F 12/ 7798, German Merchant Shipping July 1916 to July 1917 (from Mission Anglaise to Ministère de la Guerre), p. 37.
36. ↑ HAPAG/1135/UA 6/ Heinrich Green Bericht; Wendt, Heinrich, Kurs Südamerika. Brücke zwischen zwei Kontinenten, Bielefeld 1958, pp. 231, 233; AN/F 12/7798, p. 41; Fayle, Seaborne Trade 1923, pp. 159-160.
37. ↑ For general histories of the blockade, see Guichard, Blocus 1929; Bell, A.C.: A History of the Blockade of Germany and of the Countries Associated with Her in the Great War, Austria-Hungary, Bulgaria, and Turkey, 1914-1918, London 1937; Kramer, Alan: Blockade and Economic Warfare, in: Winter, Jay (ed.): The Cambridge History of the First World War, volume 2, Cambridge 2014, pp. 460-489; Lambert, Planning 2012; Osborne, Eric W.: Britain's Economic Blockade of Germany 1914-1919, London 2004. See also Halpern, Naval 1994, pp. 48-50; Fayle, Seaborne Trade 1923, pp. 148-150, 305-306.
38. ↑ Guichard, Blocus 1929, pp. 46-50, 122-127; Fayle, Seaborne Trade 1923, pp. 152-153.
39. ↑ AN/F 12/7949/ Guatemala 1916-1918, 1 September 1917; Fayle, Seaborne Trade 1920, p. 296.
40. ↑ Guichard, Blocus 1929; Bell, History 1937, pp. 256-257; Fayle, Seaborne Trade 1923, pp. 144-148, 152-158.

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